Logistics Management Institute

Assessment of the Potential for Privatizing Fuel Infrastructure at Military Installations

LG805R1

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Executive Summary

Since FY93, the responsibility for managing the Department of Defense (DoD) fuel-related infrastructure (storage tanks, pipelines, dispensing facilities, hydrants) has been divided between the military services and the Defense Logistics Agency (DLA). The military services are responsible for the maintenance and repair of the fuel infrastructure on their installations, and DLA is responsible for the infrastructures' renovation or major construction.

The funding levels for maintenance and repair of DoD's fuel infrastructure generally have been adequate. However, the lack of funding for projects to improve the fuel infrastructure has resulted in a large backlog. In 1997, DLA projected a funding shortfall of about $1 billion for the 120 renovation and major construction projects slated for FY99 through FY03. In support of DoD's effort to find ways to reduce this projected funding shortfall, the Logistics Management Institute conducted a high-level analysis of the potential for privatizing DoD fuel infrastructure at five sites. The analysis focused on answering two questions: Can DoD reduce its capital improvement costs for fuel infrastructure through privatization? If privatization is financially feasible, is new or special legislation needed to overcome legal and regulatory impediments? Our findings are summarized in Table 1.

On the basis of our analysis, we concluded that privatization of fuel infrastructure can be financially feasible, but only at certain locations—those with favorable market conditions and significant infrastructure improvement needs. Despite the limited applicability of privatization, the potential benefits are significant enough that DoD should consider privatizing the fuel infrastructure at sites where it is financially advantageous. In other words, although marketplace realities will limit the number of potential privatization sites, privatization can help reduce DoD's capital improvement costs without adversely affecting unit readiness or force protection. However, some legal impediments would have to be removed. Of particular concern are the limitations of DoD's leasing authority and requirements related to the Stewart B. McKinney Homeless Assistance Act and A-76 cost comparison studies.

Table 1. Summary of Findings

Candidate site	Privatization strategy	Military construction requirement ($ millions)	Potential savings or cost avoidance[a] ($ millions)	New or special legislative authority required?
Craney Island Terminal, Portsmouth, VA	Real estate exchange	36	None	Yes
Colorado Springs, CO	Bundling through regionalization	3.6	2.6	No
Hickam Air Force Base, HI	Shared use and product plus tariff	39	11.8	Yes
Fort Leavenworth, KS	Bundling (with a larger privatization effort)	None	None	Yes[b]
Fort Bliss, TX	Divestiture	3	3	No

[a] Cost savings computed over the contract period of the privatization project.

[b] Legislative authority would be required under one of the two scenarios considered under this strategy.

We recommend that DoD continue to assess fuel infrastructure privatization opportunities case by case and to privatize the fuel infrastructure at sites where financially feasible. Specifically, DoD should pursue its privatization opportunities at Hickam AFB and Fort Bliss—the two sites that we identified as realizing the largest potential savings from privatization. Also, DoD should conduct a high-level financial analysis of the potential for privatization at five more sites.

So that it can take full advantage of any opportunities for privatization that it identifies, DoD should propose legislation for enhanced leasing authority. This legislation should include not only the current leasing authorities prescribed in 10 U.S.C. 2667, but also authorities for DoD to do the following:

- Lease nonexcess property for up to 50 years
- Use lease revenues for construction services
- Accept construction services as payment in kind
- Expand authority for accepting maintenance and repair services as payment in kind.

The legislation should also amend two other laws: the McKinney Act (42 U.S.C. 11411) and 10 U.S.C. 2461—the law requiring analysis of commercial activities before shifting to private-sector performance. The McKinney Act should be amended so that leased property is not subject to the McKinney Act screening process. Correspondingly, 10 U.S.C. 2461 (and the implementing OMB A-76 regulations) should be amended so that DoD can accept a lease payment of in-kind services that reduces a DoD work force without performing a cost comparison study. Instead, DoD would be required to demonstrate through an economic

analysis that the work force reduction is justifiable. Moreover, the displaced DoD employees would be given the right to join the lessee's work force that performs the in-kind services.

Even if it receives enhanced legislative leasing authority and is relieved of McKinney Act and A-76 requirements, enabling it to privatize fuel infrastructure at sites where savings may be significant, DoD will realize only modest reductions in its *overall* capital improvement costs. Consequently, privatization should not be considered as a panacea for the military construction backlog. Instead, privatization should be viewed as a useful adjunct to DoD's assortment of asset management techniques.

Contents

Chapter 1
Introduction

Military forces use large quantities of fuels and lubricating oils for their ships, airplanes, tanks, and trucks. In FY97 alone, for example, the Department of Defense (DoD) purchased about 100,000 barrels of petroleum fuel products, valued in excess of $3 billion. The infrastructure required to store, transport, and distribute the fuels and oils used by DoD is extensive, ranging from fuel storage tanks, fuel pipelines, and fuel hydrants, to military gas stations. The larger storage tanks and connecting pipelines are located at nearly 300 wholesale terminal sites worldwide, and many of the larger military airfields have fuel hydrants. Smaller tanks and military gas stations can be found at nearly every military installation.

Since 1993, the responsibility for managing the fuel infrastructure has been divided between the military services and the Defense Logistics Agency (DLA). The military services are responsible for maintaining and repairing the fuel infrastructure on their installations, while DLA is responsible for renovation or major construction of DoD's fuel infrastructure.[1]

The source of funds for the fuel infrastructure depends on the type of project. Maintenance and repair projects are funded through the Defense Working Capital Fund—a revolving fund that is continually replenished by a surcharge added to DLA's sale price of fuel. In general, the funding levels for maintenance and repair of the DoD fuel infrastructure have been sufficient to fund the higher priority maintenance and repair tasks and are expected to remain adequate for the next 5 years.

Renovation and major construction projects are funded from DLA's allocation of the military construction (MILCON) appropriations. So that DLA's allocation would be commensurate with its fuel infrastructure responsibilities that it took on in 1993, DoD planned to reallocate a portion of the programmed military construction appropriation earmarked for the military departments. However, that reallocation did not occur, in part because of the congressionally directed military construction moratorium associated with the base closure process. Even after the moratorium was lifted, the military construction funding was not reallocated. As a consequence, the backlog of unfunded projects to improve the fuel infrastructure grew. By FY97, that backlog stood at 120 renovation and major construction projects projected for FY99 through FY03, with a funding shortfall of about $1 billion.

[1] DLA's Defense Fuel Supply Center (renamed to Defense Energy Support Center in 1998) also assumed responsibility for DoD's fuel inventory management, including fuels procurements and sales, and environmental oversight.

As part of its efforts to find a way to reduce the projected funding shortfall, the Office of the Deputy Under Secretary of Defense for Logistics directed the Logistics Management Institute to examine the viability of privatizing DoD's fuel infrastructure. This report conveys the results of our analysis. Throughout the study, we worked closely with a DLA-sponsored steering group.

STUDY APPROACH

Our study objective was to explore the potential of privatization as a means for reducing DLA's capital improvement costs for its fuel infrastructure. We chose to focus not only on exploring opportunities for privatizing fuel infrastructure in need of renovation or replacement, but also on exploring opportunities for privatizing infrastructure assets that are in good condition. In that way, a successful privatization effort could reap either cost savings or cost avoidance. Either way, DoD would benefit.

We pursued the study's objective systematically. First, we formulated several privatization strategies and identified sites with fuel infrastructure projects that might be good candidates for privatization. We then analyzed the effects of applying at least one of the privatization strategies to each of five projects.

Privatization Strategies

Privatization is a concept that covers a wide variety of approaches for substituting, in whole or in part, private market mechanisms for the traditional government role as employer, financier, owner, operator, or regulator of a product or service. Those approaches range from contractual arrangements to outright divestiture of activities or assets. Yet, they all share common objectives: to remove the government agency from those activities that are not inherently governmental functions or core business lines, to improve the management of remaining activities, to reduce the costs of doing business, and to shift greater performance and financial risk to the private sector.

Privatization strategies fall into three broad categories, differentiated by the source of finances and ultimate asset ownership:

- *Outsourcing.* The government uses its funds to pay a private company to do defense work or to provide a service for a defense activity. There is no change in asset ownership.

- *Using private capital.* The government attracts and uses private capital to finance its infrastructure improvements. The infrastructure assets remain under government control.

- *Divesting.* The government sells or otherwise disposes of its infrastructure, then buys the product or service directly from commercial sources.

When formulating specific privatization strategies that have potential application to DoD fuel infrastructure projects, we consulted with private-sector fuels industry representatives. In addition, because strategies should flow from objectives, we carefully considered the objectives of privatizing DoD's fuel infrastructure. Although the impetus for this study is the $1 billion backlog in military construction projects, we chose not to focus only on reducing that backlog. If we had, then our strategies would concentrate solely on infrastructure in disrepair. We did not want to limit our considerations to privatizing a relatively small set of infrastructure assets—much of which might be unattractive to the private sector primarily because they are in disrepair. Instead, we took a broader view. We viewed DoD's primary privatization objective as reducing the infrastructure's capital improvement costs, while not adversely affecting readiness and force protection. With this objective, we were able to consider a broad array of privatization strategies that offer incentives to the private sector for partnering with DoD. Consequently, potential outcomes could yield either cost savings or cost avoidance—or both. The cost savings could be realized through a reduction of the military construction backlog. The cost avoidance could be realized through arrangements for private-sector financing of yet-to-be programmed and budgeted maintenance, repair, renovation, and construction of the DoD infrastructure.

Ultimately we formulated five different privatization strategies involving the use of private capital or divestiture. We did not consider new strategies for outsourcing since DoD already has an outsourcing program with an established methodology.[2]

USE OF PRIVATE CAPITAL

We identified four alternative strategies for attracting and using private capital, each distinguished by a different business arrangement:

- *Product plus tariff.* The product-plus-tariff strategy is a mortgaging arrangement under which DoD would accept a private entity's services on its fuel infrastructure assets (such as construction or major repair) in return for a guaranty to use the private entity's fuel product at a specified cost plus a fee. For example, a DoD installation would contract with a private-sector firm to build and operate a new DoD operating storage tank in return for a long-term agreement to buy the company's fuel at a specified rate plus fee. This strategy is routinely used in the private sector between major oil companies and their franchisees.

- *Shared use.* The shared-use strategy is a public-private venture arrangement under which DoD would allow a private-sector entity to use excess capacity in a DoD fuel infrastructure asset in return for services on that asset, such as operations, maintenance, and repair. For example, a DoD

[2] See DoD Instruction 4100.33, *Commercial Activities Program*, Sept. 9, 1985, for the specific methodologies for outsourcing in DoD.

component would agree to permit a private-sector firm to share the use of an underutilized DoD bulk storage tank for its commercial uses; in return, the private firm would maintain the tank.

- *Bundling.* The bundling strategy is a marketing and packaging arrangement. Under this strategy, DoD would include fuel infrastructure assets in a broader privatization venture. There are two primary variations of this strategy. In one variation, the fuel infrastructure asset is tied to a more attractive privatization business transaction. For example, a military installation seeking to privatize its airfield (say through a public-private venture with a county that wants commercial access to the airfield for economic development) could include in its broader airfield privatization package the military gas stations and all the operating and storage fuel tanks on the installation. In the other variation, like-type infrastructure assets are bundled together in a regional privatization package. For example, military installations located near each other (say within 25 miles) could seek to privatize their military gas stations under a regional privatization package.

- *Real estate exchange.* The real estate exchange strategy is a land-for-services arrangement. Under this strategy, DoD would lease, on a long-term basis, underutilized land to the private sector in exchange for services, such as operation, maintenance, repair, and construction of selected fuel infrastructure. For example, a military service with 30 acres of underutilized land at a bulk fuel storage site would lease that land for appropriate commercial use; in return, the commercial lessee would build, operate, and maintain two new storage tanks for that military service.

DIVESTITURE

Divestiture is a different class of strategy. Instead of maintaining ownership of the fuel infrastructure and finding alternative means to maintain it, DoD would sell or otherwise dispose of its infrastructure. It would then buy the product or service associated with the divested infrastructure directly from commercial sources. For example, under the divestiture strategy, a military service would cease using a bulk storage site and, instead, would rely on a nearby commercial site for the requisite fuels. In another example, a military installation would cease using its military gas stations to fuel its vehicles and, instead, would rely on commercial or the Exchange Services' gas stations for fuel. In both examples, DoD would close down the fuel infrastructure assets (storage tanks and gas stations) and either demolish them and put the land under them to productive use or would otherwise dispose of the property (e.g., through lease or sale).

Candidate Sites for Privatization

To identify candidate fuel infrastructure projects with privatization potential, we surveyed DoD's fuel-related capital assets and reviewed the projected military

construction projects. We also consulted industry representatives from oil companies, service providers, and fuels-related associations; we wanted to learn what incentives and business conditions would motivate the private sector to invest in DoD's infrastructure. Finally, we considered factors that would make the study useful and acceptable to the DoD components. On the basis of that preliminary work, we developed the following set of selection criteria:

- *One site per military department.* All three military departments have fuel infrastructure projects on the backlogged military construction list. Potentially, all three military departments could benefit from fuel infrastructure privatization. Thus, for equity, we wanted each military department to have an opportunity to reap that benefit.

- *High-value asset/project.* Fuel infrastructure privatization is an uncommon and, generally, untested approach with DoD. We expect that most, if not all, privatization will be costly, time-consuming, and difficult to implement. To justify a privatization effort, we thought it would be useful to concentrate on potentially high-payoff projects (e.g., large cost savings in renovation or construction costs or large cost avoidance in future and unprogrammed maintenance and repair costs). Thus, we wanted DoD to focus on privatizing those high-value assets or projects that could potentially yield that high payoff.

- *High potential for commercial use.* The private sector will divert its attention from its day-to-day business to consider DoD's privatization efforts only if it sees potential for profitable commercialization of DoD's fuel infrastructure. In general, that potential will be greater in locales with increasing demands for commercial fuel that cannot be met economically with the current or projected supply of private-sector fuel infrastructure. Thus, we identified two factors to help predict the commercialization potential:

  - *Proximity to a growing metropolitan area.* If the DoD fuel infrastructure is in or relatively close to a metropolitan area with an expanding economy, it is more likely that the demand for commercial fuel will increase near the DoD infrastructure site.

  - *Proximity to a densely populated area with high real estate values.* If the DoD infrastructure site is near a densely populated area with high real estate values, it is likely that local private property owners would resist new fuel infrastructure in their area. This "not-in-my-backyard" attitude could drive up the costs of expanding the supply of private fuel infrastructure in that area.

- *Good mix of asset types.* DoD has requirements to maintain, renovate, and construct an array of fuel infrastructure assets: fuel storage tanks, fuel

hydrants, pipelines, and fuel dispensing facilities (military gas stations). Thus, we wanted to avoid focusing solely on privatizing one type of infrastructure asset.

- *Good mix of privatization strategy options.* We wanted to explore the applicability of all five privatization strategies because none of the strategies that we identified are generally used in DoD.

- *At least one site with no renovation or construction requirement for any of its fuel infrastructure.* While the impetus for the study was reducing the backlog of military construction projects, we wanted to explore the potential for avoiding future maintenance, repair, and construction costs through a fuel infrastructure privatization option.

We applied this set of selection criteria to all military installations in the United States (including Guam and Puerto Rico) and identified and ranked 25 candidate sites. On the basis of a preliminary analysis, we dropped one site—Andersen Air Force Base (AFB) in Guam—from the list.[3] We then matched potentially advantageous privatization options against the remaining 24 sites and presented that list to the steering group for its review. The list is presented in Table 1-1.

Table 1-1. Candidate Pilot Sites

Rank	Location (region or base)	Asset	Value ($ millions)	Military department	Privatization strategy
1	Craney Island Terminal, Portsmouth, VA	Storage tank	36.8	Navy	Real estate exchange
2	Colorado Springs, CO	Military gas stations	3.6	Army and Air Force	Bundling and product plus tariff
3	Hickam AFB, HI	Storage tanks and hydrants	39	Air Force	Shared use
4	Fort Leavenworth, KS	None	NA	Army	Bundling
5	Fort Bliss, KS	Storage	3	Army	Bundling or divestiture
6	Fort Wainwright/Elmendorf AFB, AK	Hydrants and storage tank	106.6	Air Force	Real estate exchange or shared use

[3] Although we thought that Andersen AFB could be an ideal site for a public-private venture (the shared-use strategy) with an air freight delivery service, we found otherwise. The Guam airport authority had already explored this notion and queried companies such as Federal Express, United Parcel Service, and DHL Worldwide Express to assess the concept's feasibility. It determined that the air freight countries had no interest in establishing transshipment facilities in Guam primarily because of labor costs. Guam, as a territory of the United States, must comply with U.S. minimum wage laws, thus pricing itself out of the Asian labor market. Moreover, with the current poor state of financial affairs in Asia, companies are not eager to increase their capital investments in the Asia market.

Table 1-1. Candidate Pilot Sites (Continued)

Rank	Location (region or base)	Asset	Value ($ millions)	Military department	Privatization strategy
7	Fort Dix/McGuire AFB, NJ	Hydrants	12	Air Force	Real estate exchange
8	Jacksonville, FL	Storage tank	24.4	Navy	Real estate exchange
9	MCAS Miramar, CA	Storage	56.2	Marine Corps	Bundling
10	Nashville Airport, Nashville, TN	Storage	15	Air Force	Shared use
11	Nellis AFB, NV	Hydrants and storage tank	45	Air Force	Divestiture or bundling
12	Richmond Airport, Richmond, VA	Storage tank	4	Air Force	Shared use
13	Fort Huachuca, AZ	Storage tank	6.8	Army	Bundling
14	Barksdale AFB, LA	Hydrants	43.8	Air Force	Real estate exchange
15	Fresno Airport, Fresno, CA	Storage	20.6	Air Force	Shared use
16	Birmingham Airport, Birmingham, AL	Storage	3	Air Force	Shared use
17	Fort Lewis/McChord AFB, WA	None	NA	Army and Air Force	Bundling and product plus tariff
18	Homestead AFB, FL	None	NA	Air Force	Real estate exchange
19	McDill AFB, FL	None	NA	Air Force	Real estate exchange
20	San Antonio, TX	None	NA	Army and Air Force	Bundling and product plus tariff
21	Reno Airport, NV	Storage	4	Air Force	Shared use
22	Travis AFB, CA	Hydrants	18.5	Air Force	Real estate exchange
23	Maxwell AFB, AL	None	NA	Air Force	Real estate exchange or bundling
24	Hunter Army Airfield, GA	None	NA	Army	Real estate exchange or bundling

After reviewing the list, the steering group directed us to evaluate the potential for privatization at the five top-ranked candidate sites: Craney Island Terminal, Portsmouth, VA; Colorado Springs, CO; Hickam Air Force Base, HI, Fort Leavenworth, KS; and Fort Bliss, TX.

Analytical Approach

In our analysis of the privatization potential at the five candidate sites, we concentrated on financial feasibility from the perspectives of both the private sector and DoD. In particular, we examined the potential of privatization strategies for reducing DoD's capital improvement costs without adversely affecting readiness and force protection. For each case, we developed a high-level analytical model that would enable us to assess financial feasibility.

In our models, we assumed that the privatization strategy being tested was unconstrained by legal and regulatory requirements. For example, we assumed that, before the military departments enter into a privatization arrangement, they would ensure they were in compliance with the pertinent federal, state, and local environmental laws (such as the National Environmental Policy Act).

We also assumed that each site would continue to meet the military units' fuel requirements. Our concern was to set each privatization scenario in such a way that unit readiness would not be adversely affected. Likewise, each privatization scenario was premised on maintaining the same level of base security that was in place before the privatization occurred. By making these assumptions, we judged that force protection would not be adversely affected if the fuels infrastructure were privatized at some sites.

In addition to a case-by-case financial analysis of privatization, we also looked at potential legal and regulatory impediments to privatization. We focused on the requirements prescribed in OMB Circular A-76 Revised Supplemental Handbook, *Performance of Commercial Activities* (March 1996), DoD's leasing authority, and the requirements of the Stewart B. McKinney Homeless Assistance Act (42 U.S.C. 11411). For potential A-76 implications, we assessed whether the privatization effort (other than divestiture) would shift work performed by 10 or more government employees to a contractor as a consequence of the privatization.[4]

Our review of legal authorities centered on DoD's authority for leasing nonexcess property. The privatization scenarios for Craney Island and Hickam AFB were premised on long-term leases that accepted construction services as payment in kind—conditions that are not authorized under the current leasing legislation, 10 U.S.C 2667. Moreover, one of the Fort Leavenworth scenarios was premised on a long-term lease that accepted maintenance and repair services for facilities not on the leased land—also conditions that are not authorized under the current leasing legislation.

[4]Title 10 U.S.C. 2461 requires the Department of Defense to analyze its requirements before outsourcing, i.e., changing a commercial activity to private-sector performance. The OMB A-76 handbook prescribes the analytical requirements that are triggered when work involving 10 or more government employees is considered for outsourcing.

The McKinney Act requires that all underutilized real property and facilities be reported to the Department of Housing and Urban Development so that the property and facilities can be screened with homeless providers to ascertain whether those assets can be used to satisfy needs of the homeless. If an application is made and accepted, the property must be conveyed to the homeless providers at no charge, and the land is no longer available for leasing. In our study of privatization strategies, we assessed whether it was likely that homeless providers would lay claim to the land associated with the privatization effort.

REPORT ORGANIZATION

The results of the study are presented in the following chapters. Chapters 2 through 6 describe the analyses of the five candidate sites and present our findings, conclusions, and recommendations for privatization at those sites. Chapter 7 summarizes our conclusions and presents general recommendations. The appendixes contain the details about each of our analytical models.

Chapter 2
The Craney Island Site

The Craney Island site met several of our selection criteria for privatization. As the only Navy site in the study, Craney Island's location in the Norfolk area offers high potential for commercial use. Furthermore, Craney Island has a MILCON requirement of high value—$36 million for the construction of 600,000 barrels of new storage capacity and for the removal of seven underground storage tanks (USTs). Privatization at Craney Island offers DoD the possibility of alleviating some, or all, of the $36 million MILCON requirement.

BACKGROUND

The Craney Island fuel depot is the largest single government fuel storage facility in the continental United States. Comprising 874 acres, the depot is located in the northeastern portion of Portsmouth, VA, on the western shoreline of Hampton Roads (Norfolk Harbor), 25 miles from the entrance to the Chesapeake Bay at Cape Henry. The surrounding area is characterized by residential, institutional, and light commercial development to the south and west. To the north are the Portsmouth city landfill and the Army Corps of Engineers dredge disposal site. To the south is the U.S. Coast Guard Base, Portsmouth, VA. Craney Island is approximately 20 miles southwest of the Sewell's Point petroleum complex and is separated from the Naval Base by the Elizabeth River. Craney Island has both underground and aboveground storage tanks, two deep-draft fueling piers, and a pipeline interface with Colonial Pipeline Company for receiving fuel. In additional, the terminal is linked to Sewell's Point with two underwater pipelines: a 10-inch dual-product pipeline dedicated to JP5 and F76 and an 8-inch pipeline dedicated to wastewater. The terminal handles, receives, stores, and issues JP5, F76, and reclaimed fuel oil. Craney Island is also equipped with a facility for generating FOR.[1]

ISSUE

As the largest fuel storage facility in the United States, Craney Island's extensive infrastructure requires significant maintenance and repair and substantial outlays of capital for asset replacement. Recently, the facility began a $21 million project to build four aboveground storage tanks and to demolish 17 USTs (because they are not in compliance with the 1998 UST requirements). Future needs, which are

[1] *Section C. Performance Work Statement (PWS), Operation and Maintenance of Defense Fuel Support Point (DFSP), Norfolk, VA*, SP0600-98-R-0042, February 1998.

not funded, include $36 million for construction of 600,000 barrels of additional capacity (four 150,000-barrel tanks) and the removal of another 7 USTs.

While Craney Island's fuels infrastructure is extensive, Craney has a significant amount of underutilized land—between 50 and 100 acres. The availability of underutilized land provides an opportunity for a real estate exchange with the private sector. By leasing the land to the private sector in exchange for the construction of new tanks for the Navy, DoD could alleviate all, or a portion of, the $36 million MILCON requirement. The purpose of our analysis is to estimate how much of the $36 million could be defrayed through a real estate exchange.

PRIVATIZATION STRATEGY

The privatization strategy that we formulated for the Craney Island site is a real estate exchange. Under this scenario, the Navy leases underutilized land to a private entity. In return, the private entity builds the fuels infrastructure needed by the Navy.[2] Under this approach, portions of the $36 million MILCON requirement can be mitigated without affecting the work force at Craney Island. Therefore, this scenario does not trigger A-76 requirements.

Given Craney Island's proximity to the Colonial Pipeline and its ability to accept delivery of fuel by barge, the Craney Island location is potentially attractive to an oil company for a fuel storage facility. The potential cost savings to a private firm can be interpreted as the maximum amount the private sector would be willing to provide in in-kind construction for the use of the land.

ANALYTICAL MODEL

To determine whether a real estate exchange would be feasible at Craney Island, we focused on the private-sector's perspective. The objective of our analytical model was to evaluate the magnitude of cost savings to the private sector associated with building fuel storage on Craney Island. The magnitude of these savings can be used as a proxy for the value of Craney land and, in turn, the amount of construction a private firm would be willing to provide to the Navy in return for the land.

From the private-sector's perspective, an oil company has two options for fuel storage: it can store fuel for the Norfolk area at a commercial fuel terminal, or it can build and operate its own storage facility. If an oil company can achieve cost savings by building and operating a private fuel facility on Craney Island land, it may be interested in a real estate exchange.

[2] At the direction of the steering group, we limited our analysis to leasing land for in-kind payments of construction only.

The Craney model can be described in a simple equation:

If [costs of private tanks on Craney] < [lease costs of commercial terminal] then [potential for privatization exists]

Private-sector interest in the venture will depend on the magnitude of the difference between the total cost of storing a barrel of fuel in infrastructure built and operated on Craney Island land and the total cost of storing a barrel of fuel at a commercial terminal.

Storage Costs in Private Tanks on Craney Island

The first step in calculating the per barrel cost of storing fuel in a private facility on Craney Island was to estimate construction and operating costs. We based our analysis on the MILCON requirement for building 600,000 barrels of storage on Craney Island.[3] Assuming the private sector builds storage tanks with similar capacity, we estimated that construction will cost $23.7 million, or $39 per barrel.[4] The details of this analysis are shown in Appendix A.

The second step in calculating the storage cost per barrel was to estimate the total cost of storing a barrel of fuel over time. Specifically, we determined the present value of storing a barrel of fuel in private tanks for 25 years. To calculate these storage costs, we assumed construction costs are financed over 5 years at 7 percent (Moody's A-rated corporate bond rate). We estimated operating costs at 2 percent of total construction costs, increasing with inflation over the 25-year period. Because the present value is calculated on the cost of storing a barrel of fuel in private-sector tanks, we used a private-sector discount rate of 15 percent. Under this model, we estimated that storing one barrel of fuel over the next 25 years would cost $38. The details of this analysis and all assumptions are discussed in Appendix B.

Storage Costs at a Commercial Terminal

Storage costs at a commercial terminal are the price a commercial terminal will charge for storing fungible product (motor or aviation fuel). Through interviews with commercial terminal operators in the Norfolk area, we determined that the market price for monthly storage of fungible product is $0.13 to $0.25 per barrel, assuming only one inventory turn per month. If inventory turns exceed one per month, commercial operators apply an excess throughput charge of $0.42 to $0.63 per barrel.

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[3] DD Form 1391, *FY 02 MILCON Project P-444, Replace Fuel Tankage, Defense Fuel Support Point, Craney Island, Portsmouth Virginia*, Dec. 5, 1997.

[4] We assumed that the private sector will build 600,000 barrels of capacity because, although storage costs decrease as capacity increases (because of economies of scale), the capacity of commercial terminals in the Norfolk area averages only 414,000 barrels. Therefore, it is unlikely that a private entity would require over 600,000 barrels of capacity.

Using the prices quoted above, we estimated the present value of storing a barrel of fuel in a commercial terminal for a 25-year period, assuming a 2 percent annual price increase to match inflation. We looked at four scenarios ranging from low price with no excess throughput charge to high price with two excess throughput charges annually. The present value of storing a barrel of fuel under each of these scenarios at a 15 percent discount rate (private sector) is shown in Table 2-1. The table also shows that, on average, it costs $25 dollars today to store one barrel of fuel for 25 years at a commercial terminal. (See Appendix B.)

Table 2-1. Present Value of Storage Cost per Barrel

Scenario	Cost
Low price, with no excess throughput charge	$12
High price, with no excess throughput charge	$22
Low price, with two excess low throughput charges annually	$18
High price, with two excess high throughput charges annually	$32
Average price, with two excess average throughput charges	$25

FINDINGS

A comparison of the costs of storing a barrel of fuel over 25 years shows that storing fuel in private tanks built on Craney Island ($38 per barrel) is 53 percent more expensive than using a commercial terminal ($25 per barrel). Therefore, it is unlikely that a private entity would be interested in using Craney Island land for fuel storage. The premium in price indicates that the value of Craney land for use as a fuel storage facility is negligible. In other words, the value an oil company would be willing to pay in terms of construction for the use of Craney land is expected to be at or close to zero. MILCON cannot be alleviated under this scenario.

The major cost differential between using commercial terminals to store fuel and building and operating private tanks on Craney Island can be explained by the current supply and demand of fuel storage in the Norfolk area.

The Norfolk area has fuel storage capacity of 6.6 million barrels, which can handle an estimated throughput of 48.5 million barrels of product annually. For 1998 however, the estimated throughput of fuel in the Norfolk area is only 33.4 million barrels, indicating a surplus of 15 million barrels of throughput capacity. This surplus drives prices down to competitive levels and explains part of the price differential shown in the cost comparison.

The current surplus in fuel storage capacity is not expected to lessen in the near future. The projected demand for fuel in the Norfolk area is relatively flat, ranging between 33 million and 34 million barrels annually through 2005. At this level, the current surplus in available fuel storage capacity will remain steady with

enough excess capacity to accommodate 14 million barrels of additional throughput annually. Because demand for additional fuel storage is unlikely to increase in the near future, increasing the supply of storage will not yield economic gains. The detail of this analysis is provided in Appendix C.

Another factor driving the price differential is the age of the current infrastructure in the Norfolk area. Much of the existing tankage and support facilities in the Norfolk area are well established (they may have been constructed more than 30 years ago), so most, if not all, of the capital investment originally required to build the commercial infrastructure has been recovered. Therefore, because they do not need to recover capital costs, commercial terminal storage operators can charge extremely low rates for fuel storage.

ANOTHER PERSPECTIVE

The Craney Island model had its basis in the exchange of land for construction. Our approach assessed the value of Craney Island's underutilized land for use as a private fuel storage facility. Under the current market conditions in the Norfolk area, few gains can be achieved by building and operating private fuel storage on Craney Island. However, at the suggestion of the steering group, we expanded our analysis to look at the potential for a real estate exchange with other industries.

As a first step, we identified industries in the Norfolk area with significant projected growth. Industrial growth is defined as increased output resulting from increases in employment, productivity, or both. Table 2-2 projects increases in employment through 2010. The three industry sectors with the largest expected growth in employment are agricultural services; construction; and finance, insurance, and real estate services.

Clearly some industries would have no interest in using the Craney Island land. For example, the probability of private-sector interest in using Craney Island's land for retail establishments is extremely low. Moreover, the use of Craney Island land by some industries would be inappropriate because of the massive fuels infrastructure currently in place and the proximity to the Craney Island Confined Disposal Facility, which holds Norfolk Harbor dredged material. In addition, environment problems on Craney Island would impede any use of the land for agricultural or forestry services. The main growth industry that might be interested in using Craney Island land is manufacturing.

As shown in Table 2-2, the manufacturing sector is expected to experience an overall growth in employment of 0.06 percent annually from 2000 to 2010; employment in nondurable manufacturing will increase 0.39 percent annually, or 4 percent over the 10-year period.

Productivity in the manufacturing sector also is expected to expand. According to the Bureau of Labor Statistics, productivity gains in manufacturing average 2.17

percent annually. Assuming a constant labor force, manufacturing output over the 10-year period will increase by approximately 22 percent from productivity gains. Together, employment growth and expected productivity gains provide a forecasted increase in manufacturing output (nondurable) of 26 percent from 2000 to 2010.

Table 2-2. Projected Annual Increase in Employment by Industry

Industry	Employment (thousands)			Increase (%)
	2000	2005	2010	
Farm	1.9	1.8	1.6	–1.70
Nonfarm	933.6	988.8	1,036.7	1.05
Private	650.8	700.2	743.3	1.34
Agricultural services, forestry	7.5	8.3	9.0	1.84
Mining	0.3	0.3	0.3	0.00
Construction	51.0	54.9	58.3	1.35
Manufacturing	64.1	64.4	64.5	0.06
Durables	38.8	38.6	38.2	–0.16
Nondurables	25.3	25.9	26.3	0.39
Transportation and public utilities	35.1	37.0	38.5	0.93
Wholesale trade	29.5	30.9	32.0	0.82
Retail trade	152.9	162.1	170.7	1.11
Finance, insurance and real estate	52.1	55.5	58.5	1.17
Total	935.5	990.6	1,038.3	1.05

Source: U.S. Department of Commerce, Economics and Statistics Administration, *Regional Economic Information System 1969-1996.*

The 26 percent increase in manufacturing output indicates there will be some additional demand for land to support the manufacturing industry by 2010. However, municipal incentives to foster development, employment, and community growth in the Norfolk area include the provision of land at a negligible cost. According to the Portsmouth Department of Economic Development, the city of Portsmouth has approximately 230 acres of property zoned M-1 or M-2 (light and heavy duty industrial). Of the 230 acres, 97 are improved and available for development, at little or no cost to industry. In addition, the Port Center, a venture by the Portsmouth Redevelopment and Housing Authority, also has land available to attract industrial business. Municipal incentives of this type are not limited to Portsmouth; they are common throughout the Norfolk area. For example, Virginia Beach has 800 to 1,000 acres available for industrial use. With these municipal

incentives in place, private-sector interest in "paying" for Craney Island land through a real estate exchange is unlikely.[5]

CONCLUSIONS

A real estate exchange of Craney Island's underutilized land for construction does not appear to be attractive to the private sector. Although Craney Island has access to both the Colonial Pipeline and the delivery of fuel by barge, the cost of building and operating private storage tanks on Craney Island land is 53 percent higher than using a commercial terminal in the Norfolk area. The premium in price indicates the value an oil company would be willing to pay in terms of construction for the use of Craney land is expected to be at or close to zero.

Much of the price premium is due to the competitive market for fuel storage in the Norfolk area. The current fuel storage infrastructure has enough excess capacity to handle an additional 15 million barrels of throughput annually. This surplus has driven the price for fuel storage in the Norfolk area down to competitive levels. These prices are not expected to increase because future demand for fuel storage is expected to remain flat.

Interviews with oil companies validated our results. Little interest in a real estate exchange existed at Craney Island. However, one company did mention that it might be interested in building and operating storage tanks on Craney Island land if payment for the operation of the Craney Island fuel depot was included as part of the package. By including the operation of the Navy facility, economies of scale could potentially be achieved by the private sector.

The potential attractiveness of Craney Island's land to an oil company for fuel storage stems from its proximity to the Colonial pipeline and Norfolk Harbor. In the manufacturing industry, however, few incentives exist to build on Craney Island. Furthermore, the economic development authorities in the Norfolk area will provide industrial land to businesses to foster development. From the private-sector's perspective, the use of municipal land will be more attractive than Craney Island because no in-kind construction would be required.

In short, real estate exchange is not an attractive option at Craney Island in the current market place. The success of a real estate exchange is driven primarily by market conditions. In a growing area where additional industrial land is needed—and is not being provided by the municipal government—available industrial land can be leased at a premium. A real estate exchange for federal land in such a

[5] Municipal incentives primarily cater to larger businesses, the same types of companies with potential interest in a real estate exchange at Craney Island. Smaller businesses pay for land in private industrial parks in the Norfolk area. These smaller businesses are not considered for this analysis as their potential involvement in a real estate exchange at Craney Island is minimal.

market would have a much higher probability of success than is the case at Craney Island.

RECOMMENDATIONS

We recommend that DoD not expend further effort to analyze the feasibility of real estate exchange at Craney Island. Instead, it should identify areas where market conditions are more conducive to a real estate exchange scenario.

The Navy could also consider formulating and analyzing a different type of privatization strategy, for example, one in which the operations of the entire Craney Island fuel depot are bundled with the real estate exchange.

Chapter 3
The Colorado Springs Site

The Colorado Springs site met several of our selection criteria for privatization. Of particular interest was its potential for regionalization, because both the Army and Air Force have facilities in the area. In addition, the Army facility, Fort Carson, has a $3.6 million MILCON requirement for fuel infrastructure, while the Air Force sites have no such requirement. An evaluation of private-sector opportunities at Colorado Springs, and a determination of whether these activities could alleviate some, or all, of the Fort Carson MILCON requirement, is therefore warranted.

BACKGROUND

The Colorado Springs area has three military installations: Peterson AFB, located at the southeast corner of Colorado Springs adjacent to the Colorado Springs municipal airport; Fort Carson, located less than 10 miles from Peterson AFB at the south end of Colorado Springs; and the Air Force Academy, located at the northwest corner of Colorado Springs, adjacent to Pine National Forest. Each of these installations has fueling requirements and significant fuels infrastructure to support their missions.

Peterson AFB has an annual throughput of 145,000 barrels of fuel, consisting of JP8, DL2, and GUM. Peterson's fuel infrastructure includes two 4,739-barrel aboveground storage tanks (ASTs) that hold JP8 and four 356-barrel underground storage tanks (USTs), which are in compliance with the 1998 UST regulations. The Academy's USTs store GUM and DL2. Peterson's one fuel dispensing facility consists of four double-walled fiberglass tanks, and one dispenser with two nozzles for each grade of product. Peterson AFB also provides some fuel services to Cheyenne Mountain Air Station, Schriever AFB, and the 2nd Space Warning Squadron at the Buckley Air National Guard base. Peterson currently has no MILCON requirements for fuel infrastructure.

The Air Force Academy's fueling needs are significantly smaller than those at Peterson AFB. The Academy has annual throughput of only 14,000 barrels of fuel, consisting of JP8, MUR, DF1, and 100 low lead. The Academy's infrastructure consists of one 50,000 barrel AST and four smaller USTs. The Academy has no current MILCON requirement for fuel infrastructure.

Fort Carson uses about 82,000 barrels of motor fuel annually (JP8, DL1, DL2, and regular unleaded). Unlike the Air Force, which stores its fuel primarily in one

location, Fort Carson's fuel infrastructure is dispersed throughout the base, with 29 active USTs and 10 fuel dispensing locations.

Recently, the Army began looking into consolidating some of these facilities into a central fueling location, closer to the Fort's training grounds. To this end, Fort Carson submitted a Form 1391 to build a central bulk storage and dispensing facility and a smaller retail facility. Both facilities would have ASTs, with appropriate spill containment basins, concrete and asphalt support pavement, overhead protective covers for the fill stations, and compressed air dispensing stations. In addition, the bulk facility would have an operations support building for administrative functions, lube oil storage, and facility maintenance activities; the retail site also would have space for operational administration.[1] This MILCON project will cost an estimated $3.6 million.

ISSUE

The Colorado Springs area is unique in that it contains three military installations with significant fuel infrastructure and a history of cooperation for the provision of installation support. These factors, plus the MILCON requirements at Fort Carson, make the Colorado Springs area a candidate for regionalization. Under a regionalization strategy, fuels operations and maintenance services across all Colorado Springs installations, plus Fort Carson's MILCON requirement, would be bundled in one privatization package. A regional package provides potential economies of scale that cannot be attained through individual contracts.

PRIVATIZATION STRATEGY

The privatization strategy we formulated for the Colorado Springs site is bundling via regionalization. Under this strategy, fuel operations and maintenance at Peterson AFB (including Cheyenne Mountain and Falcon), Fort Carson, and the Air Force Academy are bundled and privatized, using one contractor. The regional package includes all fueling operations and the construction of a $3.6 million fuel station and storage facility at Fort Carson.

ANALYTICAL MODEL

In our analysis of the potential for privatization in the Colorado Springs area, our objective was to evaluate the magnitude of the cost savings to DoD from the privatization of fuel operations at installations in the Colorado Springs area. We estimated costs for three scenarios: maintaining the status quo at all three installations; privatizing Fort Carson's fuel infrastructure, but maintaining the status quo at the Air Force installations (referred to as the Defense Energy Supply

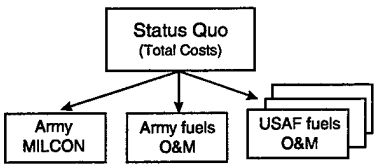
[1] Data on the Fort Carson central bulk fuel storage from Army MILCON Form 1391 (3/19/1996) provided by the Army Petroleum Center, New Cumberland, PA.

Center, or DESC, concept); and privatizing fuel-related functions at all three installations through regionalization.

For each of the three scenarios, we calculated the total costs of providing fuel services and construction. To account for differences in year-to-year cash flows, we evaluated total costs over 20 years. The cost differential between the two privatization scenarios and the status quo provides information on the potential savings that can be achieved through regionalization. The following subsections summarize the approach we took for each scenario; details are provided in Appendixes D and E.

Status Quo

The total costs identified for the status quo scenario are the operations and maintenance costs of fuel operations at each Colorado Springs installation, plus the total construction costs for the Fort Carson MILCON requirement. In our analysis, we assumed that the manpower that supports these activities remains stable over the next 20 years and that the construction of the central bulk storage and dispensing facility and the smaller retail facility at Fort Carson is completed at the beginning of the 20-year period.



A major component of our analysis was calculating the total cost of fuel operations and maintenance at each installation. At each installation, fuels operations and maintenance activities vary both in size and labor type. For example, base fuels operations are contracted out at Peterson, but are provided in-house at Fort Carson. In another example, a contractor has a $400,000 contract at Peterson AFB for transient aircraft refueling, a function that does not occur at the Academy. In general, we defined fuels operations and maintenance costs as all of the labor and nonlabor costs associated with the following activities:

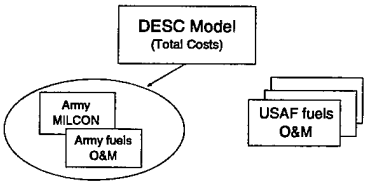
- Base fuel operations
- Fuel infrastructure maintenance and repair
- Contract oversight
- Transient aircraft refueling activities
- Acquisition and maintenance of fuel support vehicles
- Supply support (contracting).

The second component driving total costs under the status quo scenario is the construction of new Fort Carson fuels infrastructure. This $3.6 million expenditure is included in the calculation of total costs. Because the cost comparison evaluates

the present value of cost streams over 20 years, we assumed that DoD spends the $3.6 million at the start of the 20-year period.

DESC Concept

The DESC concept is based on a pilot privatization program being conducted by DESC and the Army Petroleum Center at Fort Bragg. Under the concept, fuels operations and maintenance at one installation are contracted, along with the construction of needed fuels infrastructure. This concept is proving successful at Fort Bragg and is being evaluated for use at other Army installations.



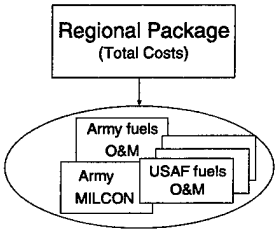
To apply the DESC concept at the Colorado Springs site, we assumed that all fueling activities at Fort Carson, including construction and operation of new infrastructure, are privatized. Specifically, a contractor, under a 5-year renewable lease agreement, is responsible for all fueling operations at Fort Carson, plus the construction and operation of the two new fuel facilities.

The contractor recovers the total costs of construction through the lease rate for the first 5-year contract period. In other words, large MILCON outlays do not occur at project inception; rather, construction costs are incorporated in the lease rate and spread over the first 5-year period. In addition, because the construction and operation of the infrastructure is contracted, much of the potential environmental liability is passed to the contractor. The first 5-year lease rate also covers annual fuels operations and maintenance costs for the period. Subsequent leases cover only fuel operations and maintenance costs.

The DESC scenario would affect the estimated 9 full-time equivalent personnel (FTEs) involved with the fuels operations and maintenance at Fort Carson. Once the activity is contracted, it is expected that 8 FTEs will no longer be necessary. Because fewer than 10 FTEs would be affected, A-76 requirements are not triggered.

The DESC scenario does not incorporate privatization of any of the Air Force operations and maintenance activities. We assumed that the costs of these activities will remain at status quo levels. The Air Force status quo costs are included in this model to enable a fair comparison of total costs between models.

Regionalization



Under the regionalization scenario, *all* military fuels operations and construction in the Colorado Springs area are privatized. For the regionalization scenario, we evaluated the total costs of using a single contractor to operate and maintain fuel facilities at all installations in the Colorado Springs area, as well as to build the Army fuel facilities. The regionalization model is similar to the DESC concept in that a 5-year contract is negotiated to cover the total costs of construction, operations, and maintenance. The variation from the DESC concept is that the regionalization approach bundles all Colorado Springs installations into one contract.

On the basis of recent studies, we assumed that for existing Air Force and Army contracts that are competitively bid, regionalization would yield 2 percent savings associated with economies of scale.[2] For services provided with in-house labor, we assumed that regionalization would result in savings of 5 percent. The differential of only 5 percent can be attributed to recent downsizing of the manpower used to provide fuels operations and maintenance functions.

The regionalization approach affects the existing labor force in the same way that it is affected under the DESC concept; eight FTEs will be no longer be necessary, resulting in significant savings for the Army. There is little impact on the Air Force in-house labor force through regionalization because most of the fuels operations and maintenance services for the Air Force installations are already contracted out. The cost savings to the Air Force and Army from regionalization are the economies of scale that can be achieved through one large contract over existing installation-specific fuels contracts.

FINDINGS

The present value of building the needed infrastructure at Fort Carson and of operating and maintaining fuel facilities at all three Colorado Springs installations is shown in Table 3-1 for each of our three scenarios. The present value is calculated over a 20-year period, using a 7 percent discount rate.

As the table shows, through a privatization initiative involving regionalization, the services can jointly save $3.1 million over the status quo. However, through just the privatization initiative at Fort Carson (the DESC concept), DoD could save about $2.6 million. The difference in potential savings between the DESC concept

[2] See, for example, Logistics Management Institute, *Joint Regional Installation Support: The Potential for Reducing Base Operations Support Costs,* Report JS803R1, David Gallay and Charles L. Horne III, May 1998. That study showed expected gains of 1 to 3 percent for contracted activities and 4 to 6 percent for services provided in-house.

and regionalization approach over the next 20 years is less than $550,000, indicating most of the potential savings over the status quo are accrued to the Army. The annual savings to the Air Force are minimal.

Table 3-1. Present Value of MILCON and O&M of Fuel Infrastructure Under Three Model Scenarios

Installation	Status quo	DESC	Regionalization
Fort Carson			
Operations	10,159,306	—	—
MILCON	3,581,000	—	—
Subtotal	13,742,306	11,168,814[a]	11,139,918
Peterson AFB operations	12,952,719	12,952,719	12,609,223
Air Force Academy operations	6,945,900	6,945,900	6,787,740
Total	33,638,925	31,067,433	30,536,881
Savings over status quo	—	2,571,492	3,102,044

[a] The Fort Carson lease rate required by the private sector for the first 5 years is approximately $1.5 million and is calculated assuming the contractor requires a 15 percent rate of return.

CONCLUSIONS

In the Colorado Springs area, no significant gains can be achieved from regionalization.

A regionalization approach would provide some savings opportunities for the Air Force. However, because most of the Air Force's fuels operations are under contract, a regional approach for providing fuels operations and maintenance would yield only nominal gains. Furthermore, because the Air Force has no MILCON requirements, no potential savings in construction costs can be achieved through privatization. In addition, the costs associated with canceling existing contracts may negate any projected savings.

A regionalization approach also would provide some savings for the Army. However, that approach would yield little or no savings over Army privatization without Air Force participation. The best alternative for Army privatization is the DESC concept, which is proving successful at Fort Bragg. By using the DESC concept (bundling fuels operations and maintenance activities with needed construction), Fort Carson can build its currently unfunded fuel facilities and can potentially save $2.6 million over the next 20 years.

RECOMMENDATIONS

Further study of regionalization in the Colorado Springs area is not warranted. However, the DESC concept used by the Army Petroleum Center is a valid approach to use at Fort Carson. Significant savings to the Army can be achieved under this model and needed MILCON can be completed at Fort Carson.

Chapter 4
The Hickam AFB Site

As a candidate for privatization of its fuel infrastructure, Hickam AFB met several of our criteria for selection. First, Hickam has a $39 million MILCON requirement to upgrade its existing hydrant and tank infrastructure. Second, Hickam is located in a robust metropolitan area—Honolulu—and is adjacent to the Honolulu International Airport (HIA). These two factors offer the potential to meet Hickam's MILCON requirement through a public-private venture with the airport's fuel operator and thus the potential for cost avoidance.

BACKGROUND

Hickam Air Force Base is the headquarters of the Pacific Air Forces and the 15th Air Base Wing. The mission of the 15th Air Base Wing is to enhance PACAF's power and reach by supporting air operations, maintaining combat-ready forces, and providing services and support in the Pacific. A major responsibility of the wing is providing maintenance and refueling for aircraft transiting Hickam between the continental United States and the Western Pacific. Aircraft assigned are two C-135s flown by the wing's 65th Airlift Squadron to provide airlift for the Commander in Chief, United States Pacific Command, and for the PACAF Commander, in addition to supporting other PACAF air operations.

The base, which consists of 2,850 acres of land and facilities valued at more than $350 million, has a joint-use agreement with the adjacent Honolulu International Airport. Under the agreement, Hickam and HIA share runways, essentially constituting a single airport complex.

ISSUE

Hickam Air Force Base's hydrant fueling system has exceeded its life expectancy. System leaks are a constant problem, and 2 of 12 hydrant outlets are out of commission. In addition, the electrical power system is unreliable; electrical failures typically cause 1-hour delays during duty hours and 2- to 4-hour delays during nonduty hours.

DLA has identified a $39 million MILCON requirement to replace the base's hydrant fueling system, including

- pump house,
- two 25,000-barrel storage tanks,

- 32 hydrant outlets,
- piping system,
- truck fill stands, and
- truck checkout station.

At issue is whether the Air Force and DLA can find alternative financing for this MILCON requirement.

PRIVATIZATION STRATEGY

The proposed privatization strategy for providing Hickam a new hydrant fueling and storage system is to expand the cooperation already in place with Honolulu International Airport. Specifically, the strategy would involve establishing a partnership with HIA's fuel owner/operator. The owner of the fueling infrastructure at the airport is a consortium of the major airlines. The airlines started the consortium to ensure that they had a steady supply and reserve of fuel. A reserve is important because the fuel production capacity on the island falls short of the demand, requiring transport of fuel from the mainland. Because mainland fuel is subject to price variability, the reserve provides a cushion to spikes in fuel price.

The consortium contracts with a private firm to operate HIA's fuel infrastructure. From discussions with that firm, LMI learned that the consortium requires an additional 200,000 barrels of fuel storage capacity. The consortium is studying proposed locations for additional storage tanks.

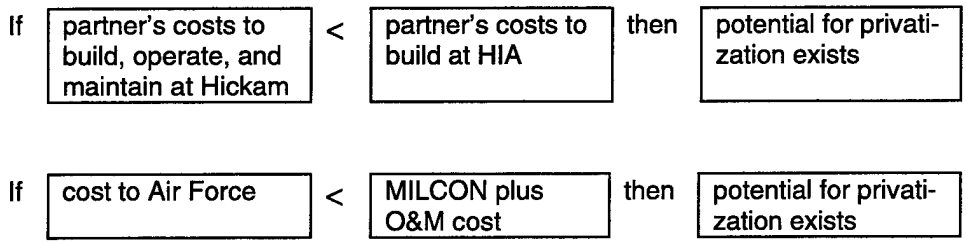
Hickam's need for new fuel infrastructure, combined with HIA's need for a site for its additional storage tanks, offer the potential for an attractive public-private venture. The specific privatization strategy that we formulated consists of an agreement between Hickam and HIA's fuel consortium. Under such an agreement, the Air Force would lease the land required for the additional tanks to the consortium. In exchange, the consortium's fuel operator would build, maintain, and operate Hickam's new hydrant fueling system as well as the consortium's new tanks.

ANALYTICAL MODEL

For the strategy to be successful, two objectives must be met:

- It must be financially feasible for a private operator to build, maintain, and operate the hydrant and fuel storage system.
- The cost to the Air Force of participating in the public-private venture must be less than the MILCON and O&M costs.

Our analytical model reflects those two objectives and can be expressed as simple equations:



For our analysis, we needed to calculate total expenses, which we defined as the cost to build, operate, and maintain the fuel infrastructure, and total revenues, which we defined as the product of the cost per barrel and the total annual throughput of fuel. To calculate the expenses and revenues associated with this privatization strategy, we made a number of conservative assumptions. For example, we reduced the $39 million value of the MILCON requirement (construction cost) by 19 percent to reflect efficiencies in private construction and the use of civilian construction specifications. We assumed that Hickam would lease 100,000 square feet of land—adequate for four 50,000-barrel storage tanks—to the HIA consortium at a rate of $5.00 per square foot.

Because the construction cost exceeds the implied value of the land to be leased to the private fuel operator, we added a 10 percent surcharge to the per barrel construction and O&M charges to be paid by the Air Force for each barrel of fuel supplied by the fuel operator. In other words, the Air Force would pay for the incremental value of the MILCON requirement through a product-plus-tariff arrangement.

We obtained information about Hickam's fuel throughput by surveying Hickam's fuel operations staff; we assumed that this throughput would remain constant over a 25-year period. Our assumptions are summarized below:

Inflation/escalation rate	2%
Private discount rate	15%
Government discount rate	7%
Construction cost	$31,590,000
O&M cost as percentage of construction cost	2%
Hickam throughput	1,670,775 barrels
Throughput fee	10% per barrel
Required land	100,000 square feet
Leased cost of land	$5.00 per square foot

FINDINGS

Given our conservative assumptions, we projected that, by following this privatization strategy, the Air Force would save $11.8 million over the 25-year lease period. This savings is the difference between the cost to the Air Force to build, operate, and maintain the MILCON requirement and the cost to a private operator to do the same. Some of the savings can be attributed to the value of the Hickam land; building on Hickam yields a $3.7 million benefit to the HIA fuel operator. Some savings also can be attributed to the private sector's ability to finance capital costs over a period of time—in this case, 7 years. Finally, from the private partner's perspective, providing the Air Force MILCON requirement has a net present value of $2.4 million. (See Appendix F for detailed tables.) The cost to the Air Force translates to $0.32 per barrel per month for the first 7 years—the period over which the private sector is likely to spread the capital costs. After this period, the value of land leased to the private sector will begin to offset the O&M costs, resulting in no additional per barrel cost to the Air Force.

The savings estimate is calculated as follows:

Cost to Air Force	$46.4 million
Cost to private operator	$34.6 million
Savings	$11.8 million

The savings estimate is conservative and does not account for economies of scale that could be realized by the private operator or for savings from reductions in the work force.

CONCLUSIONS AND RECOMMENDATIONS

On the basis of our preliminary analysis, we concluded that applying the product-plus-tariff privatization strategy at Hickam may be advantageous to the Air Force. We recommend that the Air Force continue to consider this option through a more comprehensive study that covers key elements not in the scope of our high-level analysis. At a minimum, this study should do the following:

- Assess the willingness of HIA's fuel consortium to work with the Air Force in a public-private venture.
- Determine work force requirements. Our analysis assumed that the current work force would remain in place under private-sector operations. It is likely, however, that a private operator could perform the same level of service with less staff.

- Develop a detailed estimate of the costs of building Hickam's new fuel infrastructure to commercial specifications. The possibility of reducing the actual infrastructure requirement while maintaining the desired level of service also should be considered. For example, it may be possible to reduce the number of hydrants without compromising surge requirements.

- Propose legislation for enhanced leasing authority to test fuel infrastructure privatization strategies, including not only the current leasing authorities prescribed in 10 U.S.C. 2667, but also authorities for DoD to do the following:

  - Lease nonexcess property for 50 years (or longer, if the Secretary of Defense determines that the longer term would benefit DoD or other federal government interests)

  - Use lease revenues for construction services

  - Accept construction services as payment in kind.

Chapter 5
The Fort Leavenworth Site

As a candidate for privatization of its fuel infrastructure, Fort Leavenworth met several of our selection criteria. First, Fort Leavenworth does not have a fuel infrastructure MILCON requirement, and thus presents a possibility for cost avoidance. In addition, Fort Leavenworth is located in a growing metropolitan area and its fuels infrastructure includes both storage tanks and fuel dispensing facilities. Finally, Fort Leavenworth has been seeking a partner that would be willing to operate and maintain its airfield. Together, these factors provide the opportunity to create an attractive high-value privatization project by packaging the infrastructure with the opportunity to establish a local, public airfield.

BACKGROUND

The fuel infrastructure at Fort Leavenworth consists of three 15,000-gallon underground tanks for storing JP8 fuel located at Sherman Army Airfield, and a transportation motor pool (TMP) fuel station with three 12,000-gallon underground tanks for storing diesel fuel and MOGAS. The infrastructure is relatively new, so Fort Leavenworth has no pending MILCON projects related to the fuel infrastructure.[1]

Both Fort Leavenworth and the adjacent City of Leavenworth are located in the western quadrant of the Kansas City metropolitan area. For over a decade, the Mid-America Regional Council (MARC)—the authority responsible for planning the regional airport system in the Kansas City area—and the Federal Aviation Administration (FAA) have acknowledged a need for a full-service, public-use airport in this quadrant of metropolitan Kansas City. In recognition of this need, the City of Leavenworth engaged Bucher, Willis & Ratliff, a Kansas City-based architectural and engineering firm, to conduct an airport site selection study and to develop a master plan. This study, completed in May 1993, confirmed the need for a new regional airport and recommended a site 10 miles south of the City of Leavenworth.[2] The need for an airfield in the Leavenworth area is expected to become more urgent when the National Association for Stock Car Auto Racing (NASCAR) completes the construction of an automobile race track about 15 miles from the City of Leavenworth. This racetrack, which probably will be completed

[1] Because of changes in environmental regulations, the TMP and its associated fuel tanks were replaced in 1993 to provide double-walled fiber glass construction and full in-tank monitoring. The JP8 storage tanks were replaced in 1995 after being damaged during the Midwestern floods in 1993.

[2] *Leavenworth City/County Airport Site Selection Study and Master Plan 1991-2010,* Kansas City: Bucher, Willis & Ratliff, May 1993.

in 2001, will have a measurable impact on operations and air traffic for a new regional airport from aircraft based in other parts of the country.[3]

An alternative to building a new airport is to make Sherman Army Airfield available. That alternative became a possibility as a result of two major developments that occurred after the master plan study was completed. First, the Army aircraft based at Sherman are to be reassigned to other bases, and because of budget constraints, Fort Leavenworth no longer feels it can afford to operate the airfield. As a result, the garrison command has been seeking a partner that would be willing to operate and maintain the airfield. Second, the original site recommended in the master plan study has been sold to a developer and is no longer available.

ISSUE

Although the impetus of our study was to reduce the backlog of military construction projects, we wanted to explore the potential for cost avoidance from privatizing fuels infrastructure that is in good condition. We expected this cost avoidance to be realized by having a partner assume future operations, maintenance, repair, and construction costs under a privatization initiative. In addition, because Fort Leavenworth wishes to privatize its airfield, we viewed it as an opportunity to test the feasibility of privatizing fuel infrastructure as part of a broader privatization package.

PRIVATIZATION STRATEGIES

We assessed two distinct strategies in our evaluation of the potential for privatizing Fort Leavenworth's fuels infrastructure: bundling and real estate exchange. In our analysis of the privatization of Fort Leavenworth's fuels infrastructure in the context of bundling, we assumed that the Army would seek a joint-venture partner to privatize Fort Leavenworth's airfield and would include its TMP gas station and operating fuel tanks in the privatization package. As an alternative, we assumed that the Army would lease about 50 acres of underutilized land at Fort Leavenworth to a developer in exchange for the developer's assumption of operations, maintenance, and construction costs at the base's TMP fuel station and storage tanks.

[3] According to NASCAR, attendance at its races averaged 190,625 in 1997. Conservatively, we estimated that, if one quarter of a percent of these attendees flew in on private planes and two races occurred per year at the new Kansas City track, then there would be a one-time increase of more than 10 percent in the number of operations at the new regional airport for aircraft based in other cities over that number predicted in the 1993 Leavenworth study.

ANALYTICAL MODELS

Because our assessment of the privatization opportunities for fuels infrastructure at Fort Leavenworth involved two distinct strategies, we developed two separate models to analyze the financial feasibility of the approaches. In the following paragraphs, we first provide an overview of the model that we created to analyze the bundling of Fort Leavenworth's fuels infrastructure into a broader privatization package. We then describe the basic concept and the analytical scheme underlying the model that we devised to evaluate a real estate exchange.

Bundling

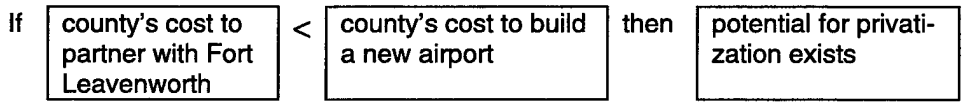
The objective of the bundling model is to determine whether privatization of an airfield at Fort Leavenworth, which incorporates the bundling of the operations, maintenance, repair, and construction of its fuels infrastructure, is financially feasible. Conceptually, the model needs to assess whether a prospective joint-venture partner can garner or generate enough value from a privatized airfield to cover operations, maintenance, and some construction of the fuels infrastructure over 25 years and still earn an acceptable return.

In our financial analysis, we considered two bundling scenarios:

- The Army's joint-venture partner would be Leavenworth County, which would establish a full-service, public-use airport.
- The Army's joint-venture partner would be a private firm, which would operate a profitable business venture using Sherman Airfield's facilities.

For both alternatives, we assumed that the joint-venture partner would facilitate operations by moving the TMP fuel station from its current location within the cantonment area to a site at the airfield.

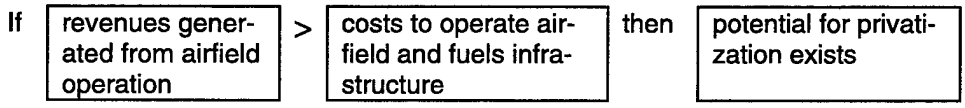
The underlying concept of the scenario in which Leavenworth County is the Army's partner is to compare the county's cost of acquiring and operating Sherman Airfield and the Army's fuels infrastructure (i.e., the county's cost of partnering with the Army to acquire an airport) with its cost of building a new airport. The concept can be expressed as follows:



The key driver for this scenario is the local political will to develop an airport.

For the scenario in which a private firm is the partner, the underlying concept of the model is to compare the costs of operating the airfield and the Army's fuels

infrastructure with the projected revenues generated from private-sector utilization. This concept can be expressed as follows:

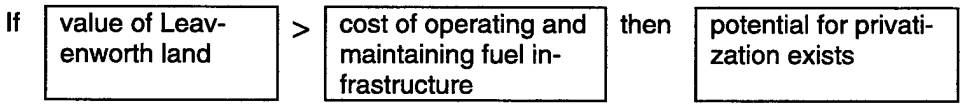


In this scenario, the key driver is essentially the private-sector demand for an airfield for general (including business) aviation.

Much of the data for our analysis of the bundling strategy at Fort Leavenworth came from the 1993 Bucher, Willis & Ratliff study. For the Leavenworth County scenario, we used the study's estimate of airport construction costs, adjusting them to create a valid comparison with the facilities at Sherman Airfield. We compared these adjusted costs to our projections of the county's incremental expenditures for acquiring and operating Sherman Airfield and the Army's fuel facilities. For the private-firm scenario, we used the demand projections in the 1993 study, adjusting them for the additional demand expected when NASCAR races begin. We used these projections to forecast pro forma revenues and combined them with our projections of expenses to create annual operating pro formas for a 25-year period. Appendix G provides a more detailed explanation of the analytical methodologies that we applied to the two bundling scenarios.

Real Estate Exchange

The fundamental objective of the real estate exchange model was to determine the financial feasibility to a partner of operating, maintaining, and improving the fuel infrastructure at Fort Leavenworth in exchange for underutilized land. The basic scheme underlying this model is that the Army leases or sells about 50 acres of underutilized land at Fort Leavenworth to a developer; in return, the developer shifts the TMP fuel station to the airfield, then operates and maintains the base's fuel infrastructure for 25 years. Conceptually, the model assesses whether the value of the land is significant enough to offset the costs of constructing a new TMP at the airfield and operating and maintaining it and the three existing airfield storage tanks for 25 years. The following expression represents this concept:



The key driver in this real estate exchange model is the value of the land.

For our analysis of the real estate exchange approach, we obtained a reliable estimate for the value of the underutilized land at Fort Leavenworth from the

Leavenworth city manager's office.[4] Our analysis compared this land value to the cost of constructing a new TMP at the airfield and the present value of the pro forma expenses that we projected for operating and maintaining the fuels infrastructure. Appendix H provides a more complete description of our analysis of real estate exchange as a privatization strategy.

FINDINGS

In our analysis of the bundling strategy in which Leavenworth County is the joint-venture partner, we found that assuming responsibility for operating Sherman Airfield instead of building a new public-use airport provides the county a net benefit of $225,000. As a result, a partnership involving Sherman would be attractive and feasible for the county from a financial perspective. The City of Leavenworth has in fact recently investigated leasing or acquiring Sherman Airfield from the Army for two key reasons:

- As previously stated, the site recommended in the master plan study has been sold to a developer and is no longer available for constructing a new airport.
- The opening of the new NASCAR track is expected to generate additional demand for an airfield.

As a result of that investigation, the city approached the local FAA branch to tap into its funding for regional airports. The FAA, however, identified three impediments that would prevent it from providing funds to assist the city in assuming control of and operating Sherman Airfield:

- The airfield is in a 100-year flood plain, but it is not protected by levies that meet the Federal Emergency Management Agency's rating requirements.[5]
- Normally the Army cannot provide more than a 5-year lease.
- Open access to the airfield is not available.[6]

Without FAA funding, the city's only option would be to seek a bond issue to finance the leasing or acquisition and operation of Sherman Airfield. However, the city manager's office does not expect the local council to support a bond issue for

[4] We are confident that these estimates are accurate because the city used the price per acre it had paid recently for industrial land purchased near the Fort's underutilized land.

[5] The levy at the south end of the airfield is rated for 50-year floods, while the levy at its north end is rated for 20-year floods.

[6] This impediment could be overcome by constructing a road extension, estimated by the garrison command to cost less than $1 million. In our analysis, we assumed that federal or state transportation funds would be available for this extension.

this purpose because more urgent needs require funding. Thus, although it is interested in converting Sherman into a regional airport, the city manager's office has adopted a strategy of not pressing the issue until the community's political priorities change.

In contrast to a joint venture with the county, a joint venture with a private firm would not be profitable. The demand from aircraft operations and associated activities would be insufficient for a private firm to profitably operate the airfield, even with an assumed 10 percent NASCAR-related increase in demand from aircraft based in other cities. In fact, our analysis predicted that a private firm would lose the present value equivalent of about $2.1 million over 25 years. Consequently, a joint Army-private firm partnership that bundled the operations of the airfield and fuel infrastructure would not be feasible.

Our analysis of the strategy involving an exchange of real estate showed that a 25-year joint venture also would not be a feasible privatization option at Fort Leavenworth. Even in the best case in which the land is sold rather than leased to the developer, the joint venture would have a negative net present value of $814,000 to the developer.

CONCLUSIONS

The only strategy for fuel infrastructure privatization that could be viable at Fort Leavenworth is one in which the Army bundles the fuel infrastructure with Sherman Airfield and partners with Leavenworth County. Such a privatization approach would not require special legislation authorizing a long-term, 25-year lease of the airfield and fuels facilities to the county.[7] Under the current 2667 authority, the Secretary of the Army could approve a lease of this length if the term is in the interest of the Army. Moreover, this type of joint venture would not trigger an A-76 requirement, because fewer than 10 government employees would be laid off. Assuming the partner moves the TMP gas station, this strategy would also have only minor repercussions on force protection, since the airfield and fuels infrastructure would be on the edge of Fort Leavenworth. In addition, while a busy public-use airport may increase air traffic noise on the base, it would have little if any other detrimental impact on the mission of Fort Leavenworth.[8]

[7] Special legislation may not have to authorize the construction of the TMP gas station at the airfield, if it is not specified in the lease. In our analysis, we assumed that the county would probably move this facility on its own volition for efficient operations.

[8] In fact, this privatization strategy enhances Fort Leavenworth's mission for two reasons. First, it allows the base to divert funds for airfield and fuels operations and maintenance to other activities. Second, by allowing the airfield to remain open, it maintains easy access to the base using military aircraft.

Fort Leavenworth is a training facility and does not serve a deployment function.[9] Nevertheless, a privatization initiative involving the Army airfield and Leavenworth County will have to await a change in the community's political climate.

As our analysis demonstrates, neither a bundling approach in which a private firm is a partner nor a real estate exchange approach is a viable fuel infrastructure privatization option. The bundling approach is not feasible because the airfield would not attract enough aircraft-related activities for a private firm to operate it profitably. We attribute this expected insufficiency in demand to Sherman Airfield's proximity to Kansas City International Airport (only 20 to 25 minutes driving distance), which eliminates the possibility of the commuter aircraft traffic that could generate the landing fees, passenger volume, and potential passenger facility charges required for profitable operation. While realizing that related activities such as aircraft repair, flying schools, and NASCAR parts distribution warehouses are certainly a possibility for improving profitability, we had no basis to predict that these activities would actually occur and thus did not factor them into our analysis.

The real estate approach is not feasible because the total value of the underutilized land is too low to offset the cost of operating the base's fuels infrastructure for 25 years. The land's value is relatively low both because little land (only 50 acres) is available and because it is unimproved, thus garnering a relatively low market price. Even if a real estate exchange were financially feasible, special legislation would be required to implement it:

- For a lease, legislation would be required to allow the operations and maintenance consideration to be provided on property other than the leased property (i.e., the fuels infrastructure).

- For an outright sale, legislation would be required to exempt the property from the Federal Property Act, which governs the sale or disposal of DoD property.

Although only one of the approaches we analyzed for Fort Leavenworth is viable and that approach may never be implemented because of local political constraints, DoD cannot and should not generalize the findings at Fort Leavenworth to other DoD sites without MILCON requirements. There may be other DoD sites where private-sector demand or community needs are sufficient to permit bundling of fuel infrastructure with another asset (such as an airfield) to make privatization attractive. In addition, other sites may have underutilized land with a high enough value to cover the operations of fuels infrastructure over a

[9] Even if Fort Leavenworth were to gain a deployment mission in the future and public use of the airfield limited the number of military transports Sherman Airfield could accommodate, Kansas City International Airport is only 20 minutes away and could provide convenient additional capacity.

significant period such as 25 years, thus making real estate exchange an attractive privatization strategy.

Although we cannot generalize most of our findings from the Fort Leavenworth study, we can make one important generalization: From a financing standpoint, DoD's mandated 5-year lease period is too short and is thus an impediment to potential financing arrangements. As noted by the FAA, providing financial assistance to Leavenworth County in its acquisition of Sherman Airfield would not be feasible for such a short time frame.

RECOMMENDATIONS

If and when political conditions in Leavenworth County permit a bond issue to finance the county's acquisition and operation of Sherman Airfield, DoD and the Army should pursue a joint venture with the county to privatize the airfield and bundle the base's fuels infrastructure into that initiative. Otherwise, DoD and the Army should not attempt to privatize Fort Leavenworth's fuel infrastructure assets, especially through a real estate exchange or by bundling them into an airfield privatization that involves a private firm.

Chapter 6
The Fort Bliss Site

Fort Bliss is an excellent candidate for assessing privatization of its fuel infrastructure because it meets several of our selection criteria. First, it has a MILCON requirement for fuel infrastructure costing nearly $3 million, thus offering an opportunity for cost savings. In addition, Fort Bliss is located in a growing metropolitan area and, for an Army installation, has a sizable fuel infrastructure that includes both storage tanks and fuel dispensing facilities. Furthermore, Fort Bliss is located next to an international airport, opening up the possibility of formulating a joint-use privatization strategy that could incorporate the fuel infrastructure. Primarily, however, Fort Bliss provides us an opportunity to explore divestiture of DoD fuel storage assets. Divestiture may be advantageous at Fort Bliss because of the prevailing conditions for product supply, the rehabilitation potential of existing storage facilities, the location and capacity of those facilities, and the fuel supply needs of the installation.

BACKGROUND

The fuel infrastructure at Fort Bliss includes a bulk fuel storage terminal and an installation transportation motor pool (TMP) fuel station. The bulk terminal is adjacent to the west end of the installation's Biggs Army Airfield and consists of

- three active, aboveground tanks with a total capacity of 300,000 gallons for storing JP8 fuel,
- an active, aboveground tank with a capacity of 25,000 gallons for storing MOGAS, and
- two out-of-service, aboveground tanks with a total capacity of 2 million gallons.

The terminal primarily stores fuel for vehicles and is staffed with two fuel handlers and a manager, who devotes about a third of his time to the facility. The installation TMP station serves only GSA vehicles. It is fully automated and about 4 years old.

In addition to these facilities, each active Army unit stationed at Fort Bliss has its own TMP station, and a contractor, Oasis Aviation, Inc., provides fuel from its own facilities to aircraft using Biggs Field.

During FY98, Fort Bliss received all of its approximately 1.4 million gallons of bulk mobility fuels by truck at its bulk terminal. Of this amount, about 1 million gallons were JP8 fuel, and 400,000 gallons were MOGAS. In addition, about 8.1 million gallons of Jet A were scheduled to be supplied for aircraft operations at Biggs Field under the Oasis contract.

Fort Bliss is adjacent to El Paso International Airport. For several years, EPIA has been considering the addition of a third runway because of an expected growth in air traffic. Because only a highway separates EPIA from Biggs Field, EPIA has been exploring the possibility of constructing a taxiway to connect to Biggs' runway and devising an agreement with the Army for joint use of that runway and other parts of the airfield.

ISSUE

To support its military units, Fort Bliss has significant fuel infrastructure that includes a bulk storage facility. In FY97, Fort Bliss requested seven MILCON projects to renovate the existing storage tanks at this facility. These seven projects had a total cost of $2,976,577. After reviewing the request, the Army Petroleum Center advised Fort Bliss to put six of these projects on hold and to reduce the scope of the seventh. As a result, Fort Bliss lowered the cost of this seventh project from $221,500 to about $51,000 and submitted a revised MILCON project requirement to DLA for funding.

Fort Bliss believes that the remaining six projects are necessary, but it requires funding for them. Consequently, the steering group recommended that we examine the prospect for funding these MILCON projects through a privatization initiative involving the bulk storage tanks, thereby saving the costs associated with them. The steering group expected these cost savings to be realized by including the relevant fuel infrastructure in a broader privatization package, particularly one relating to the privatization of an airfield. However, after obtaining data from Fort Bliss and gaining a better understanding of the conditions there, we determined that divestiture might be a better and simpler strategy for the Army.

PRIVATIZATION STRATEGY

The privatization strategy that we formulated for Fort Bliss involves the divestiture of the function and assets related to the fuel infrastructure. Specifically, the Army would divest its bulk-fuel storage function at Fort Bliss by leasing its bulk terminal to a partner at no cost for 25 years; it would then purchase fuel from that partner over the same period. In return, the partner would renovate, operate, and maintain the terminal over the length of the lease; it would recover its costs by adding a surcharge to the fuel it sells to the Army and using the existing storage capacity more effectively by operating the terminal using commercial fuel storage

practices. More effective operations would create excess capacity that the partner could use to meet non-Army needs.

ANALYTICAL MODEL

The fundamental objective of the divestiture model is to determine whether DoD (through the Army) can save costs at Fort Bliss by

- purchasing fuel from a partner when desired, rather than procuring and storing it in bulk, and
- paying a high enough surcharge on those fuel purchases so that its partner can earn an acceptable return for renovating, operating, and maintaining the fuel infrastructure.

Conceptually, the analysis needs to compare whether the fuel surcharge per gallon that the Army pays to its partner during the 25-year divestiture period is less than the cost (or the implicit surcharge per gallon) that DoD would incur over the same period by retaining the bulk storage function and itself renovating, operating, and maintaining the terminal. The model can be represented as follows:

If [surcharge paid to partner per gallon] < [MILCON and O&M cost per gallon] then [potential for privatization exists]

The key drivers for the divestiture model are the size of the MILCON requirement, the magnitude of the fuel throughput, and the amount of excess storage capacity that the partner can create and utilize.

In our analysis, we assumed that private-sector construction costs would be 81 percent of MILCON costs and that fuel throughput under divestiture would be 9.6 million gallons greater. We assumed that fuel throughput can be greater under divestiture because commercial storage practices allow significantly higher utilization rates of storage capacity than those that occur at DoD facilities. (Standard practice at commercially run storage terminals is to turn over fuel inventory about once per month.) This more efficient capacity utilization would enable DoD's partner to amortize its construction and operations costs over a much larger volume of fuel. Consequently, the partner can lower the cost per gallon of a surcharge even while receiving a competitive rate of return of 15 percent, because that return is more than offset by the increase in utilization efficiencies. (See Appendix I for additional detail.)

The specific values that we used in our analysis for construction costs and fuel throughput under divestiture and the status quo (i.e., where the Army retains the terminal function) are as follows:

Parameter	Status quo	Divestiture
Construction costs	$2,976,577	$2,411,027
Throughput (gallons)	1,426,130	11,026,130

FINDINGS

Our analysis found that DoD (through the Army) would have to pay its partner a surcharge of $0.04 to $0.05 per gallon for fuel purchases over a 25-year period if it divested the bulk storage function and terminal at Fort Bliss to that partner. However, if the Army and DoD were to retain the bulk storage function and terminal, an implicit surcharge of $0.29 would be required to recover the costs incurred for MILCON and operations at the bulk terminal over the same period. Clearly, a privatization initiative that involves divesting the bulk storage facility at Fort Bliss would be advantageous to DoD.

During our visit to Fort Bliss, we learned that the Departure Airfield Group at Fort Bliss is planning to move from the east end of Biggs Field to the west end, where the bulk fuel terminal is located. The DAG's move will necessitate shifts to the west end of the large aircraft that are associated with the unit and of Oasis Aviation, the supplier of fuel to those aircraft. Oasis has already announced its intention to construct a new facility at the west end of Biggs Field should the move occur. In addition, the military aircraft-related throughput of 8.1 million gallons that is guaranteed by Oasis Aviation's DLA contract is only a little less than the added throughput of 9.6 million gallons that would be required for utilizing all of the excess capacity of the bulk terminals, thereby producing the minimum surcharge of $0.04. Consequently, Oasis could be a potential partner in an Army attempt to privatize the bulk terminal at Fort Bliss.

CONCLUSIONS

A privatization initiative that involves the divestiture of the bulk storage terminal at Fort Bliss is likely to provide a cost savings from a DoD perspective, so it should be attractive to the Army. This cost saving occurs for two principal reasons:

- The private partner can complete the MILCON projects at 81 percent of the military's costs.
- More important, using commercial storage practices, the partner can increase the throughput of the facility significantly by creating excess storage capacity for non-Army needs, thereby subsidizing the surcharge per

gallon that the Army must pay by spreading it over a much larger fuel volume.

A privatization process that involves a divestiture structured as a 25-year lease of the bulk storage terminal would not require special legislation. Under the current 2667 authority, the Secretary of the Army could approve a lease of this length if he determines that the term promotes national defense or is in the public interest.[1] Moreover, the divestiture would not trigger an A-76 requirement, because only two government employees would be laid off.[2] The divestiture would also have only minor repercussions on force protection, since the bulk terminal is on the edge of Fort Bliss and close enough to the main highway that a separate access gate could probably be provided. In addition, there would be little if any detrimental impact on the mission of Fort Bliss, unless the partner were to underestimate or be unable to procure the quantity of fuel required to meet the Army's needs.

RECOMMENDATIONS

The Army should attempt a divestiture of the bulk storage terminal at Fort Bliss, because it would likely result in an overall cost savings to DoD, as well as reduce the MILCON requirement for fuel infrastructure. The Army should also explore the possibility of partnering with Oasis Aviation in this divestiture. However, the Army should certainly not limit its partnership candidates to this firm. While Oasis is interested in acquiring the bulk terminal to obtain fuel storage capacity to serve Fort Bliss under its DLA contract, an optimal divestiture partner for the Army would be one that is willing to acquire and fully utilize the terminal's excess capacity for civilian needs.

[1] We assumed that the Secretary of the Army will determine that the term promotes national defense, since a 25-year lease is essential to the divestiture and the resulting cost savings.

[2] The manager, the other employee associated with the bulk terminal, would not need to be laid off because he devotes only a third of his time to the facility. The A-76 requirement is triggered only if 10 or more government employees are expected to be laid off when a previously internal government activity is transferred to the private sector.

Chapter 7
Conclusions and Recommendations

Our high-level analysis of the potential for privatizing DoD fuel infrastructure at five candidate sites focused on answering two questions: Can DoD reduce its capital improvement costs for fuel infrastructure through privatization? If privatization is financially feasible, is new or special legislation needed to overcome legal and regulatory impediments? Our findings are summarized in Table 7-1.

Table 7-1. Summary of Findings

Candidate site	Privatization strategy	Military construction requirement ($ millions)	Potential savings or cost avoidance[a] ($ millions)	New or special legislative authority required?
Craney Island Terminal, Portsmouth, VA	Real estate exchange	36	None	Yes
Colorado Springs, CO	Bundling through regionalization	3.6	2.6	No
Hickam Air Force Base, HI	Shared use and product plus tariff	39	11.8	Yes
Fort Leavenworth, KS	Bundling (with a larger privatization effort)	None	None	Yes[b]
Fort Bliss, TX	Divestiture	3	3	No

[a] Cost savings computed over the contract period of the privatization project.

[b] Legislative authority would be required under one of the two scenarios considered under this strategy.

On the basis of our analysis, we concluded that privatization of fuel infrastructure can be financially feasible, but only at certain locations—those with favorable market conditions and significant infrastructure improvement needs. Despite the limited applicability of privatization, the potential benefits are significant enough that DoD should consider privatizing the fuel infrastructure at sites where it is financially advantageous. In other words, although marketplace realities will limit the number of potential privatization sites, privatization can help reduce DoD's capital improvement costs without adversely affecting unit readiness or force protection. However, some legal impediments would have to be removed. In the following sections, we discuss our conclusions in more detail and present our recommendations.

CONCLUSIONS

Financial Feasibility

We found that potential commercial uses of DoD fuel infrastructure are site specific and dependent on market demand, and market demand may shift unpredictably over time. The effects of privatization on readiness and force protection are also site specific. Thus, we concluded that the success of fuel infrastructure privatization is a function of the infrastructure asset's location and market demand at the proposed time of the privatization transaction.

While we could assess the financial feasibility of infrastructure privatization case by case, we found that we could not generalize those assessments. Unlike DoD's commercial activities program for outsourcing, no track record exists for fuel infrastructure privatization. Indeed, there is practically no experience within DoD—or anywhere else in the country's public sector—of fuel infrastructure privatization. Thus, we had no basis for projecting the results from the individual pilot sites to a DoD-wide cost savings estimate.

Legal and Regulatory Impediments

The current authority for leasing nonexcess property (10 U.S.C. 2667) severely limits the potential for DoD to capitalize on privatization opportunities. The primary constraining factors are the emphasis on short-term leases (generally, no longer than 5 years), the lack of authority for using the lease revenues for construction services, the lack of authority to accept construction services as payment in kind, and the lack of authority to accept maintenance and repair services on property other than the leased land (unless the lease involves a substantial portion of the installation). The short-term lease makes a privatization deal more expensive on an annual basis, since private investment costs must be amortized in that short-term period. As a consequence, privatization opportunities that may be financially feasible to the private sector and cost-beneficial to the military departments over the long term (such as in the Hickam AFB and Fort Bliss scenarios) are generally *not* financially feasible or cost-beneficial in the short term.

The lack of authority to use lease revenues for construction services or to barter for construction services and some nonlease-related maintenance and repair services through a payment-in-kind arrangement is also a limitation. The military departments' inability to leverage their leasing opportunities to obtain those services defeats the whole purpose of seeking private capital through privatization. Thus, current legislative authority for leasing nonexcess property to the private sector must be broadened to foster fuel infrastructure privatization.

The requirements of the Stewart B. McKinney Homeless Assistance Act (42 U.S.C. 11411) could also be an impediment to privatization. If some or all of the

underutilized property that a military department intends to lease under a privatization initiative is claimed by a homeless provider to satisfy the needs of the homeless, the privatization initiative could be put in jeopardy. To avoid that problem, fuel infrastructure privatization initiatives should be exempt from the McKinney Act requirements.

None of the scenarios we assessed in this study triggered the A-76 requirement to perform a cost comparison study before determining whether to keep the function in-house or shift it to the private sector. However, had they triggered that requirement, the privatization efforts could have been delayed by as much as 18 months—the time period allocated for an A-76 cost comparison study (36 months if more than one function is considered in the cost comparison study). In other words, the A-76 requirement could make it difficult for DoD to respond quickly to privatization opportunities. Moreover, crafting a meaningful cost comparison study between a uniquely defined in-house functional operation and a broader privatization functional approach is problematic. The associated difficulties in framing such a study could stymie the potential privatization deal. Thus, to ensure that DoD can be sufficiently agile in negotiating cost-beneficial privatization deals, it must not be encumbered by the A-76 study requirements.

RECOMMENDATIONS

We recommend that DoD continue to assess fuel infrastructure privatization opportunities case by case and to privatize the fuel infrastructure at sites where financially feasible. Specifically, DoD should pursue its privatization opportunities at Hickam AFB and Fort Bliss—the two sites that we identified in our high-level analysis as realizing the largest potential savings from privatization. DoD should also conduct a high-level financial analysis of the potential for privatization at the next five sites on the list of candidate sites:

- Fort Wainwright/Elmendorf AFB, AK
- Fort Dix/Maguire AFB, NJ
- Jacksonville Terminal, Jacksonville, FL
- MCAS Miramar, CA
- Nashville Airport, Nashville, TN.

So that it can take full advantage of any opportunities for privatization that it identifies, DoD should propose legislation for enhanced leasing authority. This legislation should include not only the current leasing authorities prescribed in 10 U.S.C. 2667, but also authorities for DoD to do the following:

- Lease nonexcess property for up to 50 years

- Use lease revenues for construction services
- Accept construction services as payment in kind
- Expand authority for accepting maintenance and repair services as payment in kind.

The legislation should also amend two other laws: the McKinney Act (42 U.S.C. 11411) and 10 U.S.C. 2461—the law requiring analysis of commercial activities before shifting to private-sector performance. The McKinney Act should be amended so that leased property is not subject to the McKinney Act screening process. Correspondingly, 10 U.S.C. 2461 (and the implementing OMB A-76 regulations) should be amended so that DoD can accept a lease payment of in-kind services that reduces a DoD work force without performing a cost comparison study. Instead, DoD would be required to demonstrate through an economic analysis that the work force reduction is justifiable. Moreover, the displaced DoD employees would be given the right to join the lessee's work force that performs the in-kind services.

Even if it employs a broader array of privatization strategies, receives enhanced legislative leasing authority, and is relieved of A-76 regulatory requirements, DoD will realize only modest reductions in its overall capital improvement costs. While savings may be quite significant at particular locations (as we have projected in the Hickam AFB scenario), the overall DoD cost reductions will be modest because privatization will be feasible and justifiable in relatively few locations—only those locations with particular market conditions that make DoD's fuel infrastructure or surrounding land desirable to the private sector. Consequently, privatization should not be considered as a panacea for the military construction backlog. Instead, privatization should be viewed as a useful adjunct to DoD's assortment of asset management techniques.

Appendix A
Craney Island: Private-Sector Costs for Construction of Fuel Storage Tanks

Our financial analysis of privatization of the Craney Island fuel infrastructure required that, among other things, we estimate the private-sector cost of building tanks with a total capacity of 600,000 barrels. This appendix explains how we derived that estimate.

As a starting point, we used the MILCON estimate for building the supporting facilities for 600,000 barrels of storage on Craney Island.[1] That estimate was nearly $24 million. We then applied a 6 percent site inspection and overhead cost that a private firm would incur, yielding an initial estimate of $25 million for the supporting facilities.

Next, we adjusted that estimate downward to account for the cost premium associated with government construction over the private sector. Studies indicate government regulations can add as much as 19 percent to construction costs. These regulations include social action clauses (use of small, disadvantaged, or women-owned businesses), cost control and accountability practices, business protection clauses (Buy American Act), and compliance with the Davis-Bacon Act, the Miller Act, and the Fair Labor Standards Act. Therefore, the cost to a private-sector firm of building its own 600,000-barrel facility is estimated at 81 percent of the government's total cost for supporting facilities.[2]

Last, we added $3,200,000 for the cost of the four tanks, for a total private-sector construction cost of $23.7 million, or $39 per barrel. Table A-1 shows the details.

[1] DD Form 1391, *FY 02 MILCON Project P-444, Replace Fuel Tankage, Defense Fuel Support Point, Craney Island, Portsmouth, Virginia*, Dec. 5, 1997.

[2] Logistics Management Institute, *The Impact of Federal Government Contracting Requirements on Design and Construction Costs*, Report NA610RD1, Jordan Cassell, Robert Campbell, and Paul Jung, October 1996.

Table A-1. Estimating the Cost of Building Private Tanks on Craney Island

Item	MILCON estimate	Site inspection and overhead (6% of MILCON)	Private-sector cost	
			Initial estimate	Adjusted (81% of initial estimate)
Supporting facilities				
Substructure	6,370,000	382,200	6,752,200	5,469,282
Site preparation	3,230,000	193,800	3,423,800	2,773,278
Site improvements	590,000	35,400	625,400	506,574
Site civil/mechanical utilities	10,950,000	657,000	11,607,000	9,401,670
Site electrical utilities	2,690,000	161,400	2,851,400	2,309,634
Subtotal	23,830,000	1,429,800	25,259,800	20,460,438
Cost of tanks				3,200,000
Total cost				23,660,438
Cost per barrel (600,000 barrels)				39

Appendix B
Craney Island: Fuel Storage Costs per Barrel

An important component in our analytical model of privatization at Craney Island is the cost of storing a barrel of fuel over time. To calculate those storage costs, we assumed construction costs are financed over 5 years at 7 percent (Moody's A-rated corporate bond rate). In addition, because the present value is calculated on the cost of storing a barrel of fuel in private-sector tanks, we used a private-sector discount rate of 15 percent. This appendix lists our assumptions and provides detailed tables of cash flow over 25 years.

ASSUMPTIONS

To estimate fuel storage costs and commercial terminal prices per barrel for our financial analysis of privatization at Craney Island, we assumed the following:

- The cost of constructing private storage tanks on Craney Island is $39 per barrel (see Appendix A). Debt service is not included in this calculation.
- The cost of operating private tanks is 2 percent of the total construction cost, increasing annually with inflation.
- Debt service on construction is 7 percent over 5 years (the length of the lease before the first renewal).
- Commercial terminal storage prices increase annually with inflation.
- Inflation remains stable at 2 percent annually.

MODEL DETAIL

Tables B-1 and B-2, respectively, contain the detailed cash flow streams for two storage alternatives: building and operating new tanks on Craney Island or storing fuel in a commercial terminal. Both analyses provide the present value of 25 years of cash flows. The present value is interpreted as the cost of storing a barrel of fuel, under each alternative, for 25 years.

Table B-1 provides the detail of the model for determining the cost of storing a barrel of fuel in private tanks on Craney Island. The inputs section depicts the total barrels of storage (600,000) and the cash flows of operating and construction costs at each time period. It is assumed total construction costs are spread over 5

years and include 7 percent debt service. The calculation section provides information on the annual operating and construction costs.

Table B-2 shows the annual outlays necessary to store fuel in a commercial terminal. The inputs section provides information on the per barrel cost of storage under the four scenarios. The calculations section evaluates the annual cost of storage for 600,000 barrels of product.

Table B-1. Cash Flow—Fuel Storage in Private Tanks on Craney Island (Bond Model)

The Cost Per Barrel of Storing Fuel in Private Tanks on Craney Island

		t=0	t=1	t=2	t=3	t=4	t=5	t=6	t=7
Inputs	Quantity of Storage (Barrels)	600,000							
	Annual Operating Costs of Private Sector Assets		$ 473,209	$ 482,673	$ 492,326	$ 502,173	$ 512,216	$522,461	$532,910
	Construction of Private Sector Assets		$5,770,561	$5,770,561	$5,770,561	$5,770,561	$5,770,561		
Calculations	Total Cost		$6,243,769	$6,253,234	$6,262,887	$6,272,734	$6,282,777	$522,461	$532,910
Results	Present Value	$ 22,802,469							
	Cost Per Barrel (Bond Model)	$ 38.00							

		t=8	t=9	t=10	t=11	t=12	t=13	t=14	t=15
Inputs	Quantity of Storage (Barrels)								
	Annual Operating Costs of Private Sector Assets	$543,568	$554,439	$565,528	$576,839	$588,376	$600,143	$612,146	$624,389
	Construction of Private Sector Assets								
Calculations	Total Cost	$543,568	$554,439	$565,528	$576,839	$588,376	$600,143	$612,146	$624,389

		t=16	t=17	t=18	t=19	t=20	t=21	t=22	t=23
Inputs	Quantity of Storage (Barrels)								
	Annual Operating Costs of Private Sector Assets	$636,877	$649,614	$662,607	$675,859	$689,376	$703,163	$717,227	$731,571
	Construction of Private Sector Assets								
Calculations	Total Cost	$636,877	$649,614	$662,607	$675,859	$689,376	$703,163	$717,227	$731,571

		t=24	t=25
Inputs	Quantity of Storage (Barrels)		
	Annual Operating Costs of Private Sector Assets	$746,203	$761,127
	Construction of Private Sector Assets		
Calculations	Total Cost	$746,203	$761,127

Table B-2. Cash Flow—Fuel Storage in Commercial Terminal

Commercial Terminal Model		t=0	t=1	t=2	t=3	t=4	t=5
Inputs							
	Quantity of Fuel		600,000	600,000	600,000	600,000	600,000
	Cost per BBL (low price no excess thruput charge)	1.56	2	2	2	2	2
	Cost per BBL (high price no excess thruput charge)	3.00	3	3.1	3.18	3	3
	Cost per BBL (low price 2 excess low thruput charges annually)	2.40	2	2	3	3	3
	Cost per BBL (high price 2 excess high thruput charges annually)	4.26	4	4	5	5	5
	Cost per BBL (average cost and 2 average excess thruput charges annually	3.33	3	3	4	4	4
Calculations	Total Cost(low price no excess thruput charge)		954,720	973,814	993,291	1,013,157	1,033,420
	Total Cost(high price no excess thruput charge)		1,836,000	1,872,720	1,910,174	1,948,378	1,987,345
	Total Cost(low price one excess low thruput charge annually)		1,468,800	1,498,176	1,528,140	1,558,702	1,589,876
	Total Cost(high price one excess high thruput charge annually)		2,607,120	2,659,262	2,712,448	2,766,697	2,822,031
	Total Cost Average Scenario		2,037,960	2,078,719	2,120,294	2,162,699	2,205,953

		t=6	t=7	t=8	t=9	t=10	t=11
Inputs							
	Quantity of Fuel	600,000	600,000	600,000	600,000	600,000	600,000
	Cost per BBL (low price no excess thruput charge)	2	2	2	2	2	2
	Cost per BBL (high price no excess thruput charge)	3	3	4	4	4	4
	Cost per BBL (low price 2 excess low thruput charges annually)	3	3	3	3	3	3
	Cost per BBL (high price 2 excess high thruput charges annually)	5	5	5	5	5	5
	Cost per BBL (average cost and 2 average excess thruput charges annually	4	4	4	4	4	4
Calculations	Total Cost(low price no excess thruput charge)	1,054,088	1,075,170	1,096,673	1,118,607	1,140,979	1,163,798
	Total Cost(high price no excess thruput charge)	2,027,092	2,067,634	2,108,987	2,151,167	2,194,190	2,238,074
	Total Cost(low price one excess low thruput charge annually)	1,621,674	1,654,107	1,687,190	1,720,933	1,755,352	1,790,459
	Total Cost(high price one excess high thruput charge annually)	2,878,471	2,936,041	2,994,761	3,054,657	3,115,750	3,178,065
	Total Cost Average Scenario	2,250,073	2,295,074	2,340,975	2,387,795	2,435,551	2,484,262

Table B-2. Cash Flow—Fuel Storage in Commercial Terminal (Continued)

		t=12	t=13	t=14	t=15	t=16	t=17
Inputs							
	Quantity of Fuel	600,000	600,000	600,000	600,000	600,000	600,000
	Cost per BBL (low price no excess thruput charge)	2	2	2	2	2	2
	Cost per BBL (high price no excess thruput charge)	4	4	4	4	4	4
	Cost per BBL (low price 2 excess low thruput charges annually)	3	3	3	3	3	3
	Cost per BBL (high price 2 excess high thruput charges annually)	5	6	6	6	6	6
	Cost per BBL (average cost and 2 average excess thruput charges annually	4	4	4	4	5	5
Calculations	Total Cost(low price no excess thruput charge)	1,187,074	1,210,816	1,235,032	1,259,733	1,284,927	1,310,626
	Total Cost(high price no excess thruput charge)	2,282,835	2,328,492	2,375,062	2,422,563	2,471,014	2,520,435
	Total Cost(low price one excess low thruput charge annually)	1,826,268	1,862,794	1,900,049	1,938,050	1,976,811	2,016,348
	Total Cost(high price one excess high thruput charge annually)	3,241,626	3,306,459	3,372,588	3,440,039	3,508,840	3,579,017
	Total Cost Average Scenario	2,533,947	2,584,626	2,636,319	2,689,045	2,742,826	2,797,682

		t=18	t=19	t=20	t=21	t=22	t=23
Inputs							
	Quantity of Fuel	600,000	600,000	600,000	600,000	600,000	600,000
	Cost per BBL (low price no excess thruput charge)	2	2	2	2	2	2
	Cost per BBL (high price no excess thruput charge)	4	4	4	5	5	5
	Cost per BBL (low price 2 excess low thruput charges annually)	3	3	4	4	4	4
	Cost per BBL (high price 2 excess high thruput charges annually)	6	6	6	6	7	7
	Cost per BBL (average cost and 2 average excess thruput charges annually	5	5	5	5	5	5
Calculations	Total Cost(low price no excess thruput charge)	1,336,838	1,363,575	1,390,847	1,418,664	1,447,037	1,475,978
	Total Cost(high price no excess thruput charge)	2,570,843	2,622,260	2,674,705	2,728,199	2,782,763	2,838,419
	Total Cost(low price one excess low thruput charge annually)	2,056,675	2,097,808	2,139,764	2,182,560	2,226,211	2,270,735
	Total Cost(high price one excess high thruput charge annually)	3,650,597	3,723,609	3,798,082	3,874,043	3,951,524	4,030,555
	Total Cost Average Scenario	2,853,636	2,910,709	2,968,923	3,028,301	3,088,867	3,150,645

Table B-2. Cash Flow—Fuel Storage in Commercial Terminal (Continued)

		t=24	t=25
Inputs			
	Quantity of Fuel	600,000	600,000
	Cost per BBL (low price no excess thruput charge)	3	3
	Cost per BBL (high price no excess thruput charge)	5	5
	Cost per BBL (low price 2 excess low thruput charges annually)	4	4
	Cost per BBL (high price 2 excess high thruput charges annually)	7	7
	Cost per BBL (average cost and 2 average excess thruput charges annually	5	5
Calculations	Total Cost(low price no excess thruput charge)	1,505,497	1,535,607
	Total Cost(high price no excess thruput charge)	2,895,187	2,953,091
	Total Cost(low price one excess low thruput charge annually)	2,316,150	2,362,473
	Total Cost(high price one excess high thruput charge annually)	4,111,166	4,193,389
	Total Cost Average Scenario	3,213,658	3,277,931

Appendix C
Craney Island: Supply and Demand for Fuel Storage in the Norfolk Area

In this appendix, we describe our approach for determining potential supply and demand for fuel storage in the Norfolk area.

CURRENT SUPPLY OF FUEL STORAGE

The supply of fuel storage is defined as the amount of annual throughput that can flow through the existing infrastructure annually. The supply of fuel storage in the Norfolk area depends on two factors: the physical capacity of fuel storage facilities in the Norfolk area and annual inventory turns at each facility. Table C-1 provides an inventory of all petroleum terminals in the Norfolk area.[1]

For each storage tank identified in Table C-1, we calculated the estimated annual throughput, or supply of fuel storage, by multiplying the current storage capacity by the annual estimated inventory turns. For fungible product, the industry standard for inventory turns is 12 times per year.[2] For nonfungible product, the inventory is expected to turn about 4 times per year. In cases where information on product type was not available, we assumed 8 inventory turns annually. The last column of the table shows the total throughput capacity for petroleum products only. We isolated the supply of tankage that holds petroleum products to ensure an accurate analysis of supply and demand for petroleum storage in the Norfolk area. As the table shows, the Norfolk area fuels infrastructure has a total capacity of 6.6 million barrels and can store 50.8 million barrels of throughput annually. The supply of storage for petroleum product only is 48.5 million barrels.

[1] Oil Price Information Service, *Petroleum Terminal Encyclopedia, Spring 1997.*

[2] If a storage tank can be used to hold inventory for more than one customer (i.e., mixing the product) the fuel is defined as fungible.

Table C-1. Inventory of Petroleum Terminals in the Norfolk Area

Company	Capacity (barrels)	Fuel type	Inventory turns	Estimated annual throughput	
				Total	Petroleum product only
Hess	19,0000	gasoline	12	2,280,000	2,280,000
Hess	48,000	diesel	12	576,000	576,000
Hess	199,000	heating oil	4	796,000	796,000
Hess	49,000	kerosene	4	196,000	196,000
Hess	474,000	residual fuel oil	4	1,896,000	1,896,000
Amoco	223,000	gasoline	12	2,676,000	2,676,000
Amoco	154,000	distillate	4	616,000	616,000
Atlantic Energy	240,000	butane	4	960,000	960,000
Atlantic Energy	240,000	propane	8	1,920,000	1,920,000
Chesapeake Terminal	88,000	ethyl alcohol	4	352,000	
Chesapeake Terminal	43,000	distillate	4	172,000	172,000
Chesapeake Terminal	43,000	gasoline	12	516,000	516,000
Citgo	347,738	not available	8	2,781,904	2,781,904
Commonwealth Propane	240,000	propane	8	1,920,000	1,920,000
Commonwealth Propane	240,000	butane	4	960,000	960,000
Conoco	25,500	gas (mid-grade unleaded)	12	306,000	306,000
Conoco	112,200	gas (super unleaded)	12	1,346,400	1,346,400
Conoco	202,000	diesel	12	2,424,000	2,424,000
Conoco	84,000	gas (unleaded)	12	1,008,000	1,008,000
Conoco	34,000	jet	12	408,000	408,000.
Exxon Company, USA	270,000	motor fuel	12	3,240,000	3,240,000
IMTT-Chesapeake	973,000	varied	8	7,784,000	7,784,000
Louis Dreyfus Energy Corp.	55,600	RFG (unleaded premium)	12	667,200	667,200
Louis Dreyfus Energy Corp.	55,600	RFG (unleaded regular)	12	667,200	667,200
Louis Dreyfus Energy Corp.	79,000	UL/RFG CARB	12	948,000	948,000
Louis Dreyfus Energy Corp.	80,000	#2 diesel	12	960,000	960,000
Louis Dreyfus Energy Corp.	55,700	unleaded premium conv.	12	668,400	668,400
Stratus Petroleum	145,000	gasoline	12	1,740,000	1,740,000
Stratus Petroleum	181,000	distillates	4	724,000	724,000
Koch Fuels	526,000	not available	8	4,208,000	4,208,000
Allied Terminals	420,000	nitrogen solutions, methanol, asphalt	4	1,680,000	

Table C-1. Inventory of Petroleum Terminals in the Norfolk Area

Company	Capacity (barrels)	Fuel type	Inventory turns	Estimated annual throughput	
				Total	Petroleum product only
Crown Central Petroleum	106,000	gasoline	12	1,272,000	1,272,000
Crown Central Petroleum	80,000	distillate	4	320,000	320,000
Mobil Oil	73,700	#1 fuel oil	4	294,800	294,800
Mobil Oil	87,300	#2 fuel oil	4	349,200	349,200
Mobil Oil	75,200	diesel	12	902,400	902,400
Mobil Oil	1,800	lube oil	4	7,200	7,200
Norfolk Oil Transit	18,000	fish oil	4	72,000	
Norfolk Oil Transit	33,000	tallow	4	132,000	
Norfolk Oil Transit	4,200	vegetable oil	4	16,800	
Norfolk Oil Transit	14,000	latex	4	56,000	
Norfolk Oil Transit	6,000	glyoxal	4	24,000	
Total	6,616,538			50,843,504	48,510,704

Source: Oil Price Information Service, *Petroleum Terminal Encyclopedia, Spring 1997.*

FUTURE DEMAND FOR FUEL STORAGE

The demand for fuel storage is defined as the amount of annual throughput capacity necessary to meet the Norfolk area consumption of fuel. Because no data on consumption of fuel in the Norfolk area are available, we calculated consumption using Virginia state data.

Figure C-1 illustrates the Virginia per capita consumption of petroleum products for 1970 through 1995. The data indicate that the consumption of fuel is falling at a rate of about 0.5 percent per year. This decrease in per capita fuel usage can be explained by increases in energy efficiency since 1970.

To forecast per capita consumption, we used the equation of the power curve shown in Figure C-1: $y = 35.555(x)^{-0.1486}$ where **x** is the number of years since 1970, or the period. For 1998 (the 28th period), the per capita consumption of fuel is $y = 35.555(28)^{-0.1486}$ or 21.67 barrels per person annually. Table C-2 provides estimates of per capita consumption for 1993 through 2005.

Figure C-1. Virginia per Capita Consumption of Petroleum Products, 1970–1995

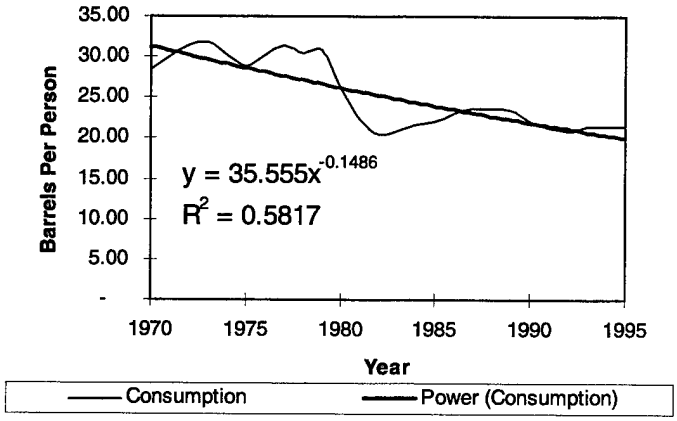


Table C-2. Projected Consumption of Petroleum Products, 1993–2005

Year	T =	Consumption per capita	Norfolk population (000)	Estimated total barrels demanded (per year)	Urban adjustment (2%)
1993	23.00	22.31	1,514	33,781,101	33,105,479
1994	24.00	22.17	1,526	33,826,652	33,150,119
1995	25.00	22.04	1,537	33,881,011	33,203,390
1996	26.00	21.91	1,549	33,943,533	33,264,662
1997	27.00	21.79	1,561	34,013,653	33,333,379
1998	28.00	21.67	1,573	34,090,870	33,409,053
1999	29.00	21.56	1,585	34,174,744	33,491,249
2000	30.00	21.45	1,598	34,264,881	33,579,584
2001	31.00	21.34	1,610	34,360,933	33,673,714
2002	32.00	21.24	1,622	34,462,585	33,773,333
2003	33.00	21.15	1,635	34,569,556	33,878,165
2004	34.00	21.05	1,647	34,681,594	33,987,962
2005	35.00	20.96	1,660	34,798,470	34,102,501

By multiplying per capita consumption estimates by the projected population in the Norfolk area, we can estimate total consumption. As the table shows, total consumption of fuel in the Norfolk area for 1998 is projected at 33.4 million barrels (after an urban adjustment of 2 percent is applied). For 1993 through 2005, the consumption of fuel in the Norfolk area is expected to increase by 1 million barrels annually, or 3 percent.

EXPECTED SUPPLY AND DEMAND FOR FUEL STORAGE

The Norfolk fuel storage infrastructure can accommodate an estimated 48.5 million barrels of petroleum throughput annually. The current consumption of fuel in the Norfolk area, however, is estimated at 33.4 million barrels annually. This surplus of 15 million barrels of available supply of fuel storage drives the price of fuel storage down. Because no change is expected in the current infrastructure and only modest gains are projected in fuel demand (33 million barrels to 34 million barrels of throughput), the current competitive prices for fuel storage should remain steady.

Appendix D
Colorado Springs: Status Quo

In our analysis of the potential for privatization at Colorado Springs, our objective was to evaluate the magnitude of the cost savings to DoD from the privatization of fuel operations at installations in the area. We estimated costs for three scenarios: maintaining the status quo at all three installations; privatizing Fort Carson's fuel infrastructure, but maintaining the status quo at the Air Force installations (referred to as the Defense Energy Supply Center, or DESC, concept); and privatizing fuel-related functions at all three installations through regionalization. This appendix describes our assumptions and provides the cash flows for the status quo scenario.

ASSUMPTIONS

We defined the status quo scenario as the total estimated construction costs for building needed fuel infrastructure at Fort Carson plus the current cost of fuels operations and maintenance for each Colorado Springs installation. The cost components and our assumptions are identified in the following subsections.

Army Construction Costs

We assumed that Fort Carson's $3.6 million MILCON requirement will be funded at the beginning of the 20-year period examined in this analysis.

Army Operating Costs

We estimated operating and maintenance costs at Fort Carson (actual fuels operations and maintenance cost data were not available) as follows:

- We assumed that the labor force necessary to provide fuels operations and maintenance at Fort Carson will remain at the current level.
- We estimated labor requirements for base operations at 0.5 FTE for each of the eight manned fueling locations at Fort Carson. Three FTEs are also included for operations at the airfield. Based on military labor cost estimates used for base realignment and closure analyses, the fully burdened labor cost per FTE is assumed to be $48,000 per year.[1]

[1] Department of Defense, *The Report of the Department of Defense on Base Realignment and Closure*, April 1998.

- Fuel lab testing for Fort Carson is conducted by the Army in New Cumberland, PA. Fort Carson incurs costs of $14 per sample to cover shipping. The number of sample shipments is approximately 100 per year.

- Two civilian FTEs, with fully burdened costs of $55,000, provide contract oversight and fuels infrastructure management at Fort Carson.[2]

- Fuels infrastructure repair was $510,000 in FY97 and included extreme one-time repairs that will not recur once newly constructed infrastructure is operational. For future years, we estimated annual repair costs at 5 percent of the original $510,000.

- We amortized annual vehicle acquisition costs (two fuel trucks with purchase prices of $175,000) on a 20-year replacement cycle.

- To determine the annual cost of vehicle maintenance, we estimated expected labor costs. Typically, a fuel truck requires 30 to 45 hours of maintenance annually (it is considered the equivalent of three sedans). Because these trucks are in heavy use at Fort Carson, we used 45 hours as the basis for estimating vehicle maintenance costs. With an estimated cost per hour of $28 for vehicle maintenance, the annual cost of vehicle maintenance is calculated at $1,260 per vehicle.

- Fuels infrastructure maintenance at Fort Carson costs $104,000 annually (based on current contract).

- Transient aircraft refueling at Fort Carson, contracted out to High Country Helicopter, costs approximately $191,000. This estimate covers a staff of three, two 3,000-gallon trucks, and a 15 percent annual return.

- Supply support and effort provided by the precision measurement equipment lab is assumed to be negligible for this analysis because none of the privatization scenarios defined will affect its operating costs.

Air Force Operating Costs

Our assumptions concerning Air Force operations and maintenance costs at Peterson AFB are as follows:

- Base fuels management, fuels infrastructure preventive maintenance, and fuels lab testing are contracted at a cost of $324,000 annually.

- Contract oversight effort is estimated at 50 percent of one civilian FTE, and 75 percent of two enlisted FTEs. Given labor cost estimates used for

[2] See Note 1.

base realignment and closure analyses, we assumed a fully burdened labor cost of $48,000 per year per military FTE and $55,000 per civilian.[3]

- We amortized annual vehicle acquisition costs (one $175,000 fuel truck, seven $160,000 fuel trucks, and three $80,000 fuel trucks) on a 20-year replacement cycle.
- We estimated annual vehicle maintenance to cost $1,260 per vehicle, assuming a labor cost of $28 per hour and 45 hours of maintenance per vehicle (as we assumed for the Army).
- Fuels infrastructure repair is conducted by the civil engineering squadron and costs about $73,000 annually.
- Transient aircraft refueling at Peterson is contracted out at a price of $406,000 annually.

Our assumptions concerning Air Force operations and maintenance costs at the Air Force Academy are as follows:

- Contract oversight is performed by one FTE at an annual cost of about $49,000.
- Base fuels management is contracted at a cost of 428,000.
- The Academy has a ground fuels management contract for $62,857 annually.
- Annual vehicle acquisition costs (two $80,000 fuel trucks) are amortized on a 20-year replacement cycle.
- Annual vehicle maintenance costs are $1,260 per vehicle, assuming a labor cost of $28 per hour and 45 hours of maintenance per vehicle (as we assumed for the Army).
- Supply support at the Academy is negligible.

Lab testing, fuels infrastructure preventive maintenance, and infrastructure repair for the Academy are provided by Peterson and are therefore included in Peterson's annual operating costs for these activities.

CASH FLOWS

We assumed that the costs of providing fuels operations and maintenance under the status quo scenario will increase annually. Specifically, for services provided

[3] See Note 1.

by in-house personnel at each Colorado Springs location, we assumed a 2.6 percent annual increase (attributed to increases in labor rates estimated by DoD). For services provided either under contract or by other government agencies, we assumed costs would increase 2 percent annually (because of inflation).

After calculating the total costs for each year in the 20-year period, we calculated the present value for the period using a 7 percent discount rate, as defined in OMB Circular A-94. We calculated the total costs of the status quo scenario by adding the present value of Air Force and Army operations plus $3.6 million for Army construction. Tables D-1 and D-2 show the detailed cash flows for Fort Carson and for the two Air Force installations, respectively.

Table D-1. Cash Flows for Status Quo Scenario: Fort Carson

Activity	Total Expense	Inflator	t=0	t=1	t=2	t=3	t=4	t=5	t=6	t=7
Base Fuels Management	336,000	Labor Increase	336,000	344,400	353,010	361,835	370,881	380,153	389,657	399,398
Fuel Lab Testing	1,400	inflation	1,400	1,428	1,457	1,486	1,515	1,546	1,577	1,608
Contract Oversight	55,000	Labor Increase	55,000	56,375	57,784	59,229	60,710	62,227	63,783	65,378
Fuels Infrastructure Management	55,000	Labor Increase	55,000	56,375	57,784	59,229	60,710	62,227	63,783	65,378
Fuels Infrastructure Maintenance	104,000	Inflation	104,000	106,080	108,202	110,366	112,573	114,824	117,121	119,463
Fuels Infrastructure Repair	25,500	Inflation	25,500	26,010	26,530	27,061	27,602	28,154	28,717	29,291
Current Fuel Vehicles	17,500	Labor Increase	17,500	17,938	18,386	18,846	19,317	19,800	20,295	20,802
Current Fuel Vehicle Maintenance	2,520	Inflation	2,520	2,570	2,622	2,674	2,728	2,782	2,838	2,895
Transient Aircraft	190,647	inflation	190,647	194,460	198,349	202,316	206,362	210,490	214,699	218,993
Supply Support	-	Labor Increase	-	-	-	-	-	-	-	-
Precision Measurement Equipment Lab	-	Labor Increase	-	-	-	-	-	-	-	-
Fort Carson Total Expenses	***787,567***		***787,567***	***805,636***	***824,124***	***843,041***	***862,398***	***882,204***	***902,470***	***923,207***

Table D-1. Cash Flows for Status Quo: Fort Carson (Continued)

Activity	Total Expense	Inflator	t=8	t=9	t=10	t=11	t=12	t=13	t=14	t=15
Base Fuels Management	336,000	Labor Increase	409,383	419,618	430,108	440,861	451,883	463,180	474,759	486,628
Fuel Lab Testing	1,400	inflation	1,640	1,673	1,707	1,741	1,776	1,811	1,847	1,884
Contract Oversight	55,000	Labor Increase	67,012	68,687	70,405	72,165	73,969	75,818	77,714	79,656
Fuels Infrastructure Management	55,000	Labor Increase	67,012	68,687	70,405	72,165	73,969	75,818	77,714	79,656
Fuels Infrastructure Maintenance	104,000	Inflation	121,853	124,290	126,775	129,311	131,897	134,535	137,226	139,970
Fuels Infrastructure Repair	25,500	Inflation	29,877	30,475	31,084	31,706	32,340	32,987	33,647	34,320
Current Fuel Vehicles	17,500	Labor Increase	21,322	21,855	22,401	22,962	23,536	24,124	24,727	25,345
Current Fuel Vehicle Maintenance	2,520	Inflation	2,953	3,012	3,072	3,133	3,196	3,260	3,325	3,392
Transient Aircraft	190,647	inflation	223,373	227,841	232,398	237,046	241,786	246,622	251,555	256,586
Supply Support	-	Labor Increase	-	-	-	-	-	-	-	-
Precision Measurement Equipment Lab	-	Labor Increase	-	-	-	-	-	-	-	-
Fort Carson Total Expenses	***787,567***		***944,426***	***966,138***	***988,355***	***1,011,089***	***1,034,351***	***1,058,155***	***1,082,513***	***1,107,438***

Table D-1. Cash Flows for Status Quo: Fort Carson (Continued)

Activity	Total Expense	Inflator	t=16	t=17	t=18	t=19	t=20
Base Fuels Management	336,000	Labor Increase	498,794	511,264	524,045	537,146	550,575
Fuel Lab Testing	1,400	inflation	1,922	1,960	2,000	2,040	2,080
Contract Oversight	55,000	Labor Increase	81,648	83,689	85,781	87,926	90,124
Fuels Infrastructure Management	55,000	Labor Increase	81,648	83,689	85,781	87,926	90,124
Fuels Infrastructure Maintenance	104,000	Inflation	142,770	145,625	148,538	151,508	154,539
Fuels Infrastructure Repair	25,500	Inflation	35,006	35,706	36,420	37,149	37,892
Current Fuel Vehicles	17,500	Labor Increase	25,979	26,628	27,294	27,976	28,676
Current Fuel Vehicle Maintenance	2,520	Inflation	3,459	3,529	3,599	3,671	3,745
Transient Aircraft	190,647	inflation	261,717	266,952	272,291	277,737	283,291
Supply Support	-	Labor Increase	-	-	-	-	-
Precision Measurement Equipment Lab	-	Labor Increase	-	-	-	-	-
Fort Carson Total Expenses	**787,567**		**1,132,943**	**1,159,042**	**1,185,749**	**1,213,079**	**1,241,045**

Table D-2. Cash Flows for Status Quo: Peterson AFB and Air Force Academy

Activity-Peterson AFB	***Total Expense***	***Inflator***	***t=0***	***t=1***	***t=2***	***t=3***	***t=4***	***t=5***	***t=6***	***t=7***
Base Fuels Management	324,000	inflation	324,000	330,480	337,090	343,831	350,708	357,722	364,877	372,174
Fuel Lab Testing	-	inflation	-	-	-	-	-	-	-	-
Contract Oversight	104,379	Labor Increase	104,379	106,988	109,663	112,405	115,215	118,095	121,048	124,074
Fuel Equip/Vehicles Acquisition	76,750	inflation	76,750	78,285	79,851	81,448	83,077	84,738	86,433	88,162
Fuel Equip Maintenance	13,860	Labor Increase	13,860	14,207	14,562	14,926	15,299	15,681	16,073	16,475
Fuels Infrastructure Preventive Maintenance	-	inflation	-	-	-	-	-	-	-	-
Fuels Infrastructure Repair	96,093	Labor Increase	96,093	98,496	100,958	103,482	106,069	108,721	111,439	114,225
Precision Measurement Equipment Lab	-	Labor Increase	-	-	-	-	-	-	-	-
Peterson Total Expenses	***615,082***		***615,082***	***628,456***	***642,123***	***656,092***	***670,368***	***684,958***	***699,869***	***715,110***

Additional Activities-Peterson	***Total Expense***	***Inflator***	***t=0***	***t=1***	***t=2***	***t=3***	***t=4***	***t=5***	***t=6***	***t=7***
Transient Alert	406,000	inflation	406,000	414,120	422,402	430,850	439,467	448,257	457,222	466,366
Supply Support	-	Labor Increase	-	-	-	-	-	-	-	-
Peterson Supplemental Expenses	***406,000***		***406,000***	***414,120***	***422,402***	***430,850***	***439,467***	***448,257***	***457,222***	***466,366***

Activity-AF Academy	***Total Expense***	***Inflator***	***t=0***	***t=1***	***t=2***	***t=3***	***t=4***	***t=5***	***t=6***	***t=7***
Lab Testing	-	inflation	-	-	-	-	-	-	-	-
Contract Oversight	48,840	Labor Increase	48,840	50,061	51,313	52,595	53,910	55,258	56,639	58,055
Base Fuels Management	428,316	inflation	428,316	436,882	445,620	454,532	463,623	472,895	482,353	492,000
Ground Fuels Management	62,857	inflation	62,857	64,114	65,397	66,705	68,039	69,399	70,787	72,203
Ground Fuel Vehicles	8,000	inflation	8,000	8,160	8,323	8,490	8,659	8,833	9,009	9,189
Ground Fuel Vehicle Maintenance	2,520	inflation	2,520	2,570	2,622	2,674	2,728	2,782	2,838	2,895
Fuels Infrastructure Preventive Maintenance	-	inflation	-	-	-	-	-	-	-	-
Fuels Infrastructure Repair	-	Labor Increase	-	-	-	-	-	-	-	-
Academy Total Expenses	***550,533***		***550,533***	***561,788***	***573,274***	***584,996***	***596,959***	***609,168***	***621,627***	***634,343***

Table D-2. Cash Flows for Status Quo: Peterson AFB and Air Force Academy (Continued)

Activity-Peterson AFB	Total Expense	inflator	t=8	t=9	t=10	t=11	t=12	t=13	t=14	t=15
Base Fuels Management	324,000	inflation	379,618	387,210	394,954	402,853	410,910	419,129	427,511	436,061
Fuel Lab Testing	-	inflation	-	-	-	-	-	-	-	-
Contract Oversight	104,379	Labor Increase	127,176	130,355	133,614	136,954	140,378	143,888	147,485	151,172
Fuel Equip/Vehicles Acquisition	76,750	inflation	89,925	91,723	93,558	95,429	97,338	99,284	101,270	103,295
Fuel Equip Maintenance	13,860	Labor Increase	16,887	17,309	17,742	18,186	18,640	19,106	19,584	20,073
Fuels Infrastructure Preventive Maintenance	-	inflation	-	-	-	-	-	-	-	-
Fuels Infrastructure Repair	96,093	Labor Increase	117,080	120,007	123,008	126,083	129,235	132,466	135,777	139,172
Precision Measurement Equipment Lab	-	Labor Increase	-	-	-	-	-	-	-	-
Peterson Total Expenses	***615,082***		***730,686***	***746,605***	***762,876***	***779,505***	***796,501***	***813,872***	***831,627***	***849,774***

Additional Activities-Peterson	Total Expense	inflator	t=8	t=9	t=10	t=11	t=12	t=13	t=14	t=15
Transient Alert	406,000	inflation	475,694	485,208	494,912	504,810	514,906	525,204	535,708	546,423
Supply Support	-	Labor Increase	-	-	-	-	-	-	-	-
Peterson Supplemental Expenses	***406,000***		***475,694***	***485,208***	***494,912***	***504,810***	***514,906***	***525,204***	***535,708***	***546,423***

Activity-AF Academy	Total Expense	inflator	t=8	t=9	t=10	t=11	t=12	t=13	t=14	t=15
Lab Testing	-	inflation	-	-	-	-	-	-	-	-
Contract Oversight	48,840	Labor Increase	59,507	60,994	62,519	64,082	65,684	67,326	69,010	70,735
Base Fuels Management	428,316	inflation	501,840	511,877	522,115	532,557	543,208	554,072	565,154	576,457
Ground Fuels Management	62,857	inflation	73,647	75,120	76,623	78,155	79,718	81,312	82,939	84,597
Ground Fuel Vehicles	8,000	inflation	9,373	9,561	9,752	9,947	10,146	10,349	10,556	10,767
Ground Fuel Vehicle Maintenance	2,520	inflation	2,953	3,012	3,072	3,133	3,196	3,260	3,325	3,392
Fuels Infrastructure Preventive Maintenance	-	inflation	-	-	-	-	-	-	-	-
Fuels Infrastructure Repair	-	Labor Increase	-	-	-	-	-	-	-	-
Academy Total Expenses	***550,533***		***647,320***	***660,564***	***674,080***	***687,875***	***701,953***	***716,320***	***730,983***	***745,948***

Table D-2. Cash Flows for Status Quo: Peterson AFB and Air Force Academy (Continued)

Activity-Peterson AFB	***Total Expense***	***Inflator***	***t=16***	***t=17***	***t=18***	***t=19***	***t=20***
Base Fuels Management	324,000	inflation	444,783	453,678	462,752	472,007	481,447
Fuel Lab Testing	-	inflation	-	-	-	-	-
Contract Oversight	104,379	Labor Increase	154,951	158,825	162,796	166,866	171,037
Fuel Equip/Vehicles Acquisition	76,750	inflation	105,361	107,469	109,618	111,810	114,046
Fuel Equip Maintenance	13,860	Labor Increase	20,575	21,090	21,617	22,157	22,711
Fuels Infrastructure Preventive Maintenance	-	inflation	-	-	-	-	-
Fuels Infrastructure Repair	96,093	Labor Increase	142,651	146,217	149,873	153,620	157,460
Precision Measurement Equipment Lab	-	Labor Increase	-	-	-	-	-
Peterson Total Expenses	***615,082***		***868,321***	***887,279***	***906,655***	***926,460***	***946,702***

Additional Activities-Peterson	***Total Expense***	***inflator***	***t=16***	***t=17***	***t=18***	***t=19***	***t=20***
Transient Alert	406,000	inflation	557,351	568,498	579,868	591,465	603,295
Supply Support	-	Labor Increase	-	-	-	-	-
Peterson Supplemental Expenses	***406,000***		***557,351***	***568,498***	***579,868***	***591,465***	***603,295***

Activity-AF Academy	***Total Expense***	***inflator***	***t=16***	***t=17***	***t=18***	***t=19***	***t=20***
Lab Testing	-	inflation	-	-	-	-	-
Contract Oversight	48,840	Labor Increase	72,503	74,316	76,174	78,078	80,030
Base Fuels Management	428,316	inflation	587,986	599,746	611,741	623,976	636,455
Ground Fuels Management	62,857	inflation	86,289	88,015	89,775	91,571	93,402
Ground Fuel Vehicles	8,000	inflation	10,982	11,202	11,426	11,654	11,888
Ground Fuel Vehicle Maintenance	2,520	inflation	3,459	3,529	3,599	3,671	3,745
Fuels Infrastructure Preventive Maintenance	-	inflation	-	-	-	-	-
Fuels Infrastructure Repair	-	Labor Increase	-	-	-	-	-
Academy Total Expenses	***550,533***		***761,220***	***776,807***	***792,715***	***808,950***	***825,520***

Appendix E
Colorado Springs: DESC Concept and Regionalization

In our analysis of the potential for privatization at Colorado Springs, our objective was to evaluate the magnitude of the cost savings to DoD from the privatization of fuel operations at installations in the area. We estimated costs for three scenarios: maintaining the status quo at all three installations; privatizing Fort Carson's fuel infrastructure, but maintaining the status quo at the Air Force installations (referred to as the Defense Energy Supply Center, or DESC, concept); and privatizing fuel-related functions at all three installations through regionalization. In this appendix, we describe our assumptions for the DESC concept and the regionalization approach. We also provide tables illustrating the cash flows under the two privatization scenarios.

ASSUMPTIONS

DESC Concept

We defined the DESC concept as the total costs of providing construction, operation, and maintenance of fuels infrastructure at Fort Carson under contract with a private entity. Fuels operations and maintenance at the Air Force locations remain unchanged from the status quo.

ARMY CONSTRUCTION COSTS

The Form 1391 defining the needed fuels infrastructure at Fort Carson estimates the total cost of construction at $3.6 million. Because the DESC concept calls for a private contractor to provide Fort Carson's needed construction, we estimated the construction cost at $2.9 million, 81 percent of the government's total cost for the same infrastructure.[1] We assumed that the private sector will finance the construction of the fuel facilities over 5 years at a 7 percent corporate bond rate.

[1] Studies indicate that government regulations can add as much as 19 percent to construction costs. These regulations include social action clauses (use of small, disadvantaged, or women-owned businesses), cost control and accountability practices, business protection clauses (Buy American Act), and compliance with the Davis-Bacon Act, the Miller Act, and the Fair Labor Standards Act.

ARMY OPERATING COSTS

The Army's total costs under the DESC scenario assume a contractor has constructed the fuel facilities identified in the Fort Carson MILCON and is now responsible for the operation and maintenance of all fuels infrastructure on base. We assumed the new construction will consolidate fueling and alleviate the need for smaller dispensing facilities. The assumptions driving these costs are as follows:

- The contractor requires a 15 percent rate of return over the cost of providing construction and fuels operations at Fort Carson.
- The new facilities are automated and require two FTEs for day-to-day operations. The total cost is $100,000 annually.
- Infrastructure maintenance is 2 percent of construction cost.
- Transient aircraft refueling, currently contracted out to High Country Helicopter, will be taken over by the new contractor. The current contract price of approximately $191,000 (based on a staff of three and two 3,000-gallon trucks) remains the same. A 15 percent annual return is built into this estimate.
- Annual vehicle acquisition costs (two fuel trucks with purchase prices of $175,000) are amortized on a 20-year replacement cycle.
- The annual cost of vehicle maintenance is driven by labor costs. Typically, a fuel truck requires 30 to 45 hours of maintenance annually (it is considered the equivalent of three sedans). Because these trucks are in heavy use at Fort Carson, we used 45 hours as the basis for estimating vehicle maintenance costs. With an estimated cost per hour of $28 for vehicle maintenance, the annual cost of vehicle maintenance is $1,260 per vehicle.
- Estimates of custodial costs and refuse removal are based on a 1,750-square-foot facility. Using national averages, refuse removal costs an estimated $0.05 per square foot, and custodial services cost an estimated $0.74 per square foot.[2]
- Grounds maintenance (street sweeping, snow removal, etc.) costs an estimated $0.18 per gross square foot for a total of 79,000 gross square feet.[3]
- Utilities generally cost an estimated $1.62 per square foot.[4] However, since the Fort Carson facility is fairly energy intensive, we used a

[2] Institute of Real Estate Managers, *Income and Expense Analysis*, 1997.

[3] See Note 2.

[4] See Note 2.

multiplier of two to provide conservative estimates of energy costs for the facility.

- Yearly insurance premiums cost $25,000, and various fees total $1,000 annually.
- Fuel lab testing for Fort Carson continues to be conducted by the Army in New Cumberland, PA. Fort Carson incurs costs of $14 per sample to cover shipping. The number of sample shipments is approximately 100 per year.
- One in-house FTE remains involved with contract oversight for the fuels function. The estimated annual cost for this civilian employee is $55,000 annually.[5]
- Supply support and effort provided by the precision measurement equipment lab are assumed to be negligible for this analysis.

AIR FORCE OPERATING COSTS

The DESC scenario does not impact the operations of the Air Force either at Peterson or the Academy. In other words, the assumptions used for the status quo scenario (Appendix D) are the same assumptions used for the DESC scenario.

Regionalization

Our assumptions for the strategy in which fuel-related functions would be privatized at all three installations through regionalization are identical to those for the DESC concept except the DESC concept does not account for the economies of scale that can be gained from regionalization. The regionalization approach, therefore, is based on the DESC concept's construction and operating costs, but modified as follows to account for the economies of scale gained from using one contractor:

- For services currently provided in-house, we reduced costs from the DESC scenario by 5 percent.
- For services already contracted, we reduced costs from the DESC scenario by 2 percent.

CASH FLOWS

We assumed that the costs of fuels operations and maintenance under the DESC concept and the regionalization approach will increase annually. Specifically, we assumed that, for services originally provided by in-house personnel at each

[5] Department of Defense, *The Report of the Department of Defense on Base Realignment and Closure*, April 1998, p. 48.

Colorado Springs installation, costs will grow 2.6 percent annually (because of increases in labor rates estimated by DoD). For services provided under contract at Fort Carson and the Air Force sites, costs will increase 2 percent annually (because of inflation).

After calculating the total costs for each year in the 20-year period, we calculated the present value for the period using a 7 percent discount rate, as defined in OMB Circular A-94. The total costs of each model were calculated by adding the present value of Air Force and Army operations at the Colorado Springs site, including the construction costs and debt service for Fort Carson construction.

Tables E-1 and E-2 show the detailed cash flows for the DESC concept for Fort Carson and for the two Air Force installations, respectively. Tables E-3 and E-4 show the cash flows for the regionalization scenario.

Table E-1. Cash Flows for DESC Scenario: Fort Carson

Contract Costs	***inflator***	***t=0***	***t=1***	***t=2***	***t=3***	***t=4***	***t=5***	***t=6***
Construction (includes Debt Service)	No Change		873,373	873,373	873,373	873,373	873,373	
Contract Staff	Inflation	100,000	102,500	105,063	107,689	110,381	113,141	115,969
Maintenance	Inflation	58,012	59,172	60,356	61,563	62,794	64,050	65,331
Transient Aircraft	inflation	190,647	194,460	198,349	202,316	206,362	210,490	214,699
Fuels Vehicles	inflation	17,500	17,850	18,207	18,571	18,943	19,321	19,708
Fuels Vehicle Maintenance	Inflation	2,520	2,570	2,622	2,674	2,728	2,782	2,838
Refuse Removal	Inflation	88	89	91	93	95	97	99
Custodial	Inflation	1,295	1,321	1,347	1,374	1,402	1,430	1,458
Grounds Maintenance	Inflation	14,216	14,500	14,790	15,086	15,387	15,695	16,009
Utilities	Inflation	5,670	5,783	5,899	6,017	6,137	6,260	6,385
Insurance	Inflation	25,000	25,500	26,010	26,530	27,061	27,602	28,154
Fees	Inflation	1,000	1,020	1,040	1,061	1,082	1,104	1,126
Total Cost		415,947	1,298,139	1,307,147	1,316,347	1,325,745	1,335,345	471,777
Profit		73,402	229,083	230,673	232,297	233,955	235,649	83,255
Sub-Total Contract Cost		***489,350***	***1,527,222***	***1,537,819***	***1,548,644***	***1,559,700***	***1,570,994***	***555,032***
In-House Costs		***t=0***	***t=1***	***t=2***	***t=3***	***t=4***	***t=5***	***t=6***
Fuel Lab Testing	inflation	1,400	1,428	1,457	1,486	1,515	1,546	1,577
Contract Oversight	Labor Increase	55,000	56,375	57,784	59,229	60,710	62,227	63,783
Supply Support	Labor Increase	-	-	-	-	-	-	-
Precision Measurement Equipment Lab	Labor Increase	-	-	-	-	-	-	-
Sub Total Army In- House Costs		56,400	57,803	59,241	60,715	62,225	63,773	65,360
Army Total costs			***1,585,025***	***1,597,060***	***1,609,359***	***1,621,925***	***1,634,767***	***620,392***

Table E-1. Cash Flows for DESC Scenario: Fort Carson (Continued)

Contract Costs	***Inflator***	***t=7***	***t=8***	***t=9***	***t=10***	***t=11***	***t=12***	***t=13***
Construction (includes Debt Service)	No Change							
Contract Staff	Inflation	118,869	121,840	124,886	128,008	131,209	134,489	137,851
Maintenance	Inflation	66,638	67,971	69,330	70,717	72,131	73,573	75,045
Transient Aircraft	inflation	218,993	223,373	227,841	232,398	237,046	241,786	246,622
Fuels Vehicles	inflation	20,102	20,504	20,914	21,332	21,759	22,194	22,638
Fuels Vehicle Maintenance	Inflation	2,895	2,953	3,012	3,072	3,133	3,196	3,260
Refuse Removal	Inflation	101	103	105	107	109	111	113
Custodial	Inflation	1,488	1,517	1,548	1,579	1,610	1,642	1,675
Grounds Maintenance	Inflation	16,329	16,656	16,989	17,329	17,675	18,029	18,389
Utilities	Inflation	6,513	6,643	6,776	6,912	7,050	7,191	7,335
Insurance	Inflation	28,717	29,291	29,877	30,475	31,084	31,706	32,340
Fees	Inflation	1,149	1,172	1,195	1,219	1,243	1,268	1,294
Total Cost		481,793	492,023	502,472	513,146	524,049	535,186	546,562
Profit		85,022	86,828	88,672	90,555	92,479	94,445	96,452
Sub-Total Contract Cost		***566,815***	***578,850***	***591,144***	***603,702***	***616,529***	***629,631***	***643,015***
In-House Costs		***t=7***	***t=8***	***t=9***	***t=10***	***t=11***	***t=12***	***t=13***
Fuel Lab Testing	inflation	1,608	1,640	1,673	1,707	1,741	1,776	1,811
Contract Oversight	Labor Increase	65,378	67,012	68,687	70,405	72,165	73,969	75,818
Supply Support	Labor Increase	-	-	-	-	-	-	-
Precision Measurement Equipment Lab	Labor Increase	-	-	-	-	-	-	-
Sub Total Army In- House Costs		66,986	68,652	70,361	72,111	73,905	75,744	77,629
Army Total costs		***633,801***	***647,503***	***661,505***	***675,813***	***690,434***	***705,375***	***720,644***

Table E-1. Cash Flows for DESC Scenario: Fort Carson (Continued)

Contract Costs	***inflator***	***t=14***	***t=15***	***t=16***	***t=17***	***t=18***	***t=19***	***t=20***
Construction (includes Debt Service)	No Change							
Contract Staff	Inflation	141,297	144,830	148,451	152,162	155,966	159,865	163,862
Maintenance	Inflation	76,546	78,077	79,638	81,231	82,856	84,513	86,203
Transient Aircraft	inflation	251,555	256,586	261,717	266,952	272,291	277,737	283,291
Fuels Vehicles	inflation	23,091	23,553	24,024	24,504	24,994	25,494	26,004
Fuels Vehicle Maintenance	Inflation	3,325	3,392	3,459	3,529	3,599	3,671	3,745
Refuse Removal	Inflation	115	118	120	123	125	127	130
Custodial	Inflation	1,709	1,743	1,778	1,813	1,850	1,887	1,924
Grounds Maintenance	Inflation	18,757	19,132	19,515	19,905	20,303	20,709	21,123
Utilities	Inflation	7,481	7,631	7,784	7,939	8,098	8,260	8,425
Insurance	Inflation	32,987	33,647	34,320	35,006	35,706	36,420	37,149
Fees	Inflation	1,319	1,346	1,373	1,400	1,428	1,457	1,486
Total Cost		558,183	570,053	582,178	594,564	607,216	620,140	633,343
Profit		98,503	100,598	102,737	104,923	107,156	109,437	111,766
Sub-Total Contract Cost		***656,686***	***670,651***	***684,916***	***699,487***	***714,372***	***729,577***	***745,109***
In-House Costs		***t=14***	***t=15***	***t=16***	***t=17***	***t=18***	***t=19***	***t=20***
Fuel Lab Testing	inflation	1,847	1,884	1,922	1,960	2,000	2,040	2,080
Contract Oversight	Labor Increase	77,714	79,656	81,648	83,689	85,781	87,926	90,124
Supply Support	Labor Increase	-	-	-	-	-	-	-
Precision Measurement Equipment Lab	Labor Increase	-	-	-	-	-	-	-
Sub Total Army In- House Costs		79,561	81,541	83,570	85,649	87,781	89,965	92,204
Army Total costs		***736,247***	***752,191***	***768,485***	***785,137***	***802,153***	***819,542***	***837,313***

Table E-2. Cash Flows for DESC Scenario: Peterson AFB and Air Force Academy

Activity-Peterson AFB	Total Expense	inflator	t=0	t=1	t=2	t=3	t=4	t=5	t=6	t=7
Base Fuels Management	324,000	inflation	324,000	330,480	337,090	343,831	350,708	357,722	364,877	372,174
Fuel Lab Testing	-	inflation	-	-	-	-	-	-	-	-
Contract Oversight	104,379	Labor Increase	104,379	106,988	109,663	112,405	115,215	118,095	121,048	124,074
Fuel Equip/Vehicles Acquisition	76,750	inflation	76,750	78,285	79,851	81,448	83,077	84,738	86,433	88,162
Fuel Equip Maintenance	13,860	Labor Increase	13,860	14,207	14,562	14,926	15,299	15,681	16,073	16,475
Fuels Infrastructure Preventive Maintenance	-	inflation	-	-	-	-	-	-	-	-
Fuels Infrastructure Repair	96,093	Labor Increase	96,093	98,496	100,958	103,482	106,069	108,721	111,439	114,225
Precision Measurement Equipment Lab	-	Labor Increase	-	-	-	-	-	-	-	-
Peterson Total Expenses	***615,082***		***615,082***	***628,456***	***642,123***	***656,092***	***670,368***	***684,958***	***699,869***	***715,110***

Additional Activities-Peterson	Total Expense	inflator	t=0	t=1	t=2	t=3	t=4	t=5	t=6	t=7
Transient Alert	406,000	inflation	406,000	414,120	422,402	430,850	439,467	448,257	457,222	466,366
Supply Support	-	Labor Increase	-	-	-	-	-	-	-	-
Peterson Supplemental Expenses	***406,000***		***406,000***	***414,120***	***422,402***	***430,850***	***439,467***	***448,257***	***457,222***	***466,366***

Activity-AF Academy	Total Expense	inflator	t=0	t=1	t=2	t=3	t=4	t=5	t=6	t=7
Lab Testing	-	inflation	-	-	-	-	-	-	-	-
Contract Oversight	48,840	Labor Increase	48,840	50,061	51,313	52,595	53,910	55,258	56,639	58,055
Base Fuels Management	428,316	inflation	428,316	436,882	445,620	454,532	463,623	472,895	482,353	492,000
Ground Fuels Management	62,857	inflation	62,857	64,114	65,397	66,705	68,039	69,399	70,787	72,203
Ground Fuel Vehicles	8,000	inflation	8,000	8,160	8,323	8,490	8,659	8,833	9,009	9,189
Ground Fuel Vehicle Maintenance	2,520	inflation	2,520	2,570	2,622	2,674	2,728	2,782	2,838	2,895
Fuels Infrastructure Preventive Maintenance	-	inflation	-	-	-	-	-	-	-	-
Fuels Infrastructure Repair	-	Labor Increase	-	-	-	-	-	-	-	-
Academy Total Expenses	***550,533***		***550,533***	***561,788***	***573,274***	***584,996***	***596,959***	***609,168***	***621,627***	***634,343***

Table E-2. Cash Flows for DESC Scenario: Peterson AFB and Air Force Academy (Continued)

Activity-Peterson AFB	***Total Expense***	***inflator***	***t=8***	***t=9***	***t=10***	***t=11***	***t=12***	***t=13***	***t=14***	***t=15***
Base Fuels Management	324,000	inflation	379,618	387,210	394,954	402,853	410,910	419,129	427,511	436,061
Fuel Lab Testing	-	inflation	-	-	-	-	-	-	-	-
Contract Oversight	104,379	Labor Increase	127,176	130,355	133,614	136,954	140,378	143,888	147,485	151,172
Fuel Equip/Vehicles Acquisition	76,750	inflation	89,925	91,723	93,558	95,429	97,338	99,284	101,270	103,295
Fuel Equip Maintenance	13,860	Labor Increase	16,887	17,309	17,742	18,186	18,640	19,106	19,584	20,073
Fuels Infrastructure Preventive Maintenance	-	inflation	-	-	-	-	-	-	-	-
Fuels Infrastructure Repair	96,093	Labor Increase	117,080	120,007	123,008	126,083	129,235	132,466	135,777	139,172
Precision Measurement Equipment Lab	-	Labor Increase	-	-	-	-	-	-	-	-
Peterson Total Expenses	***615,082***		***730,686***	***746,605***	***762,876***	***779,505***	***796,501***	***813,872***	***831,627***	***849,774***

Additional Activities-Peterson	***Total Expense***	***inflator***	***t=8***	***t=9***	***t=10***	***t=11***	***t=12***	***t=13***	***t=14***	***t=15***
Transient Alert	406,000	inflation	475,694	485,208	494,912	504,810	514,906	525,204	535,708	546,423
Supply Support	-	Labor Increase	-	-	-	-	-	-	-	-
Peterson Supplemental Expenses	***406,000***		***475,694***	***485,208***	***494,912***	***504,810***	***514,906***	***525,204***	***535,708***	***546,423***

Activity-AF Academy	***Total Expense***	***inflator***	***t=8***	***t=9***	***t=10***	***t=11***	***t=12***	***t=13***	***t=14***	***t=15***
Lab Testing	-	inflation	-	-	-	-	-	-	-	-
Contract Oversight	48,840	Labor Increase	59,507	60,994	62,519	64,082	65,684	67,326	69,010	70,735
Base Fuels Management	428,316	inflation	501,840	511,877	522,115	532,557	543,208	554,072	565,154	576,457
Ground Fuels Management	62,857	inflation	73,647	75,120	76,623	78,155	79,718	81,312	82,939	84,597
Ground Fuel Vehicles	8,000	inflation	9,373	9,561	9,752	9,947	10,146	10,349	10,556	10,767
Ground Fuel Vehicle Maintenance	2,520	inflation	2,953	3,012	3,072	3,133	3,196	3,260	3,325	3,392
Fuels Infrastructure Preventive Maintenance	-	inflation	-	-	-	-	-	-	-	-
Fuels Infrastructure Repair	-	Labor Increase	-	-	-	-	-	-	-	-
Academy Total Expenses	***550,533***		***647,320***	***660,564***	***674,080***	***687,875***	***701,953***	***716,320***	***730,983***	***745,948***

Table E-2. Cash Flows for DESC Scenario: Peterson AFB and Air Force Academy (Continued)

Activity-Peterson AFB	***Total Expense***	***inflator***	***t=16***	***t=17***	***t=18***	***t=19***	***t=20***
Base Fuels Management	324,000	inflation	444,783	453,678	462,752	472,007	481,447
Fuel Lab Testing	-	inflation	-	-	-	-	-
Contract Oversight	104,379	Labor Increase	154,951	158,825	162,796	166,866	171,037
Fuel Equip/Vehicles Acquisition	76,750	inflation	105,361	107,469	109,618	111,810	114,046
Fuel Equip Maintenance	13,860	Labor Increase	20,575	21,090	21,617	22,157	22,711
Fuels Infrastructure Preventive Maintenance	-	inflation	-	-	-	-	-
Fuels Infrastructure Repair	96,093	Labor Increase	142,651	146,217	149,873	153,620	157,460
Precision Measurement Equipment Lab	-	Labor Increase	-	-	-	-	-
Peterson Total Expenses	***615,082***		***868,321***	***887,279***	***906,655***	***926,460***	***946,702***

Additional Activities-Peterson	***Total Expense***	***inflator***	***t=16***	***t=17***	***t=18***	***t=19***	***t=20***
Transient Alert	406,000	inflation	557,351	568,498	579,868	591,465	603,295
Supply Support	-	Labor Increase	-	-	-	-	-
Peterson Supplemental Expenses	***406,000***		***557,351***	***568,498***	***579,868***	***591,465***	***603,295***

Activity-AF Academy	***Total Expense***	***inflator***	***t=16***	***t=17***	***t=18***	***t=19***	***t=20***
Lab Testing	-	inflation	-	-	-	-	-
Contract Oversight	48,840	Labor Increase	72,503	74,316	76,174	78,078	80,030
Base Fuels Management	428,316	inflation	587,986	599,746	611,741	623,976	636,455
Ground Fuels Management	62,857	inflation	86,289	88,015	89,775	91,571	93,402
Ground Fuel Vehicles	8,000	inflation	10,982	11,202	11,426	11,654	11,888
Ground Fuel Vehicle Maintenance	2,520	inflation	3,459	3,529	3,599	3,671	3,745
Fuels Infrastructure Preventive Maintenance	-	inflation	-	-	-	-	-
Fuels Infrastructure Repair	-	Labor Increase	-	-	-	-	-
Academy Total Expenses	***550,533***		***761,220***	***776,807***	***792,715***	***808,950***	***825,520***

Table E-3. Cash Flows for Regionalization Scenario: Fort Carson

Contract Costs	***t=0***	***regionalized costs at t=0***	***t=1***	***t=2***	***t=3***	***t=4***	***t=5***
Construction (includes Debt Service)			873,373	873,373	873,373	873,373	873,373
Contract Staff	100,000	98,000	99,960	101,959	103,998	106,078	108,200
Maintenance	71,620	70,188	71,591	73,023	74,484	75,973	77,493
Transient Aircraft	190,647	186,834	190,571	194,382	198,270	202,235	206,280
Fuels Vehicles	17,500	17,150	17,493	17,843	18,200	18,564	18,935
Fuels Vehicle Maintenance	2,520	2,470	2,519	2,569	2,621	2,673	2,727
Refuse Removal	88	86	87	89	91	93	95
Custodial	1,295	1,269	1,294	1,320	1,347	1,374	1,401
Grounds Maintenance	14,216	13,931	14,210	14,494	14,784	15,080	15,381
Utilities	5,670	5,557	5,668	5,781	5,897	6,015	6,135
Insurance	25,000	24,500	24,990	25,490	26,000	26,520	27,050
Fees	1,000	980	1,000	1,020	1,040	1,061	1,082
Total Cost	429,555		1,302,756	1,311,343	1,320,103	1,329,037	1,338,151
Profit	75,804		229,898	231,414	232,959	234,536	236,144
Sub-Total Contract Cost	505,359		1,532,654	1,542,757	1,553,062	1,563,573	1,574,295
In-House Costs	***t=0***	***regionalized costs at t=0***	***t=1***	***t=2***	***t=3***	***t=4***	***t=5***
Fuel Lab Testing	1,400	1,372	1,399	1,427	1,456	1,485	1,515
Contract Oversight	55,000	52,250	53,556	54,895	56,268	57,674	59,116
Supply Support	-	-	-	-	-	-	-
Precision Measurement Equipment Lab	-	-	-	-	-	-	-
Sub Total Army In- House Costs			54,956	56,323	57,724	59,159	60,631
Army Total costs			***1,587,610***	***1,599,080***	***1,610,786***	***1,622,733***	***1,634,926***

Table E-3. Cash Flows for Regionalization Scenario: Fort Carson (Continued)

Contract Costs	***t=6***	***t=7***	***t=8***	***t=9***	***t=10***	***t=11***	***t=12***	***t=13***
Construction (includes Debt Service)								
Contract Staff	110,364	112,571	114,823	117,119	119,461	121,851	124,288	126,773
Maintenance	79,043	80,623	82,236	83,881	85,558	87,269	89,015	90,795
Transient Aircraft	210,405	214,614	218,906	223,284	227,750	232,305	236,951	241,690
Fuels Vehicles	19,314	19,700	20,094	20,496	20,906	21,324	21,750	22,185
Fuels Vehicle Maintenance	2,781	2,837	2,894	2,951	3,010	3,071	3,132	3,195
Refuse Removal	97	98	100	102	105	107	109	111
Custodial	1,429	1,458	1,487	1,517	1,547	1,578	1,610	1,642
Grounds Maintenance	15,689	16,003	16,323	16,649	16,982	17,322	17,668	18,021
Utilities	6,258	6,383	6,510	6,641	6,773	6,909	7,047	7,188
Insurance	27,591	28,143	28,706	29,280	29,865	30,463	31,072	31,693
Fees	1,104	1,126	1,148	1,171	1,195	1,219	1,243	1,268
Total Cost	474,074	483,555	493,226	503,091	513,153	523,416	533,884	544,562
Profit	83,660	85,333	87,040	88,781	90,556	92,367	94,215	96,099
Sub-Total Contract Cost	557,734	568,888	580,266	591,872	603,709	615,783	628,099	640,661
In-House Costs	***t=6***	***t=7***	***t=8***	***t=9***	***t=10***	***t=11***	***t=12***	***t=13***
Fuel Lab Testing	1,545	1,576	1,608	1,640	1,672	1,706	1,740	1,775
Contract Oversight	60,594	62,109	63,662	65,253	66,884	68,557	70,270	72,027
Supply Support	-	-	-	-	-	-	-	-
Precision Measurement Equipment Lab	-	-	-	-	-	-	-	-
Sub Total Army In- House Costs	62,139	63,685	65,269	66,893	68,557	70,262	72,010	73,802
Army Total costs	***619,873***	***632,573***	***645,535***	***658,764***	***672,266***	***686,046***	***700,109***	***714,463***

Table E-3. Cash Flows for Regionalization Scenario: Fort Carson (Continued)

Contract Costs	***t=14***	***t=15***	***t=16***	***t=17***	***t=18***	***t=19***	***t=20***
Construction (includes Debt Service)							
Contract Staff	129,309	131,895	134,533	137,224	139,968	142,767	145,623
Maintenance	92,611	94,463	96,353	98,280	100,245	102,250	104,295
Transient Aircraft	246,524	251,454	256,483	261,613	266,845	272,182	277,626
Fuels Vehicles	22,629	23,082	23,543	24,014	24,494	24,984	25,484
Fuels Vehicle Maintenance	3,259	3,324	3,390	3,458	3,527	3,598	3,670
Refuse Removal	113	115	118	120	122	125	127
Custodial	1,675	1,708	1,742	1,777	1,813	1,849	1,886
Grounds Maintenance	18,382	18,750	19,125	19,507	19,897	20,295	20,701
Utilities	7,332	7,478	7,628	7,781	7,936	8,095	8,257
Insurance	32,327	32,974	33,633	34,306	34,992	35,692	36,406
Fees	1,293	1,319	1,345	1,372	1,400	1,428	1,456
Total Cost	555,453	566,562	577,893	589,451	601,240	613,265	625,530
Profit	98,021	99,982	101,981	104,021	106,101	108,223	110,388
Sub-Total Contract Cost	653,474	666,544	679,874	693,472	707,341	721,488	735,918
In-House Costs	***t=14***	***t=15***	***t=16***	***t=17***	***t=18***	***t=19***	***t=20***
Fuel Lab Testing	1,810	1,847	1,883	1,921	1,960	1,999	2,039
Contract Oversight	73,828	75,674	77,565	79,505	81,492	83,529	85,618
Supply Support	-	-	-	-	-	-	-
Precision Measurement Equipment Lab	-	-	-	-	-	-	-
Sub Total Army In- House Costs	75,638	77,520	79,449	81,426	83,452	85,528	87,656
Army Total costs	***729,112***	***744,064***	***759,323***	***774,898***	***790,793***	***807,016***	***823,574***

Table E-4. Cash Flows for Regionalization Scenario: Peterson AFB and Air Force Academy

Peterson Activity	**t=0**	**regionalized costs at t=0**	**t=1**	**t=2**	**t=3**	**t=4**	**t=5**
Base Fuels Management	324,000	317,520	323,870	330,348	336,955	343,694	350,568
Fuel Lab Testing	-	-	-	-	-	-	-
Contract Oversight	104,379	99,160	101,639	104,180	106,785	109,454	112,190
Fuel Equip/Vehicles Acquisition	76,750	75,215	76,719	78,254	79,819	81,415	83,043
Fuel Equip Maintenance	13,860	13,167	13,496	13,834	14,179	14,534	14,897
Fuels Infrastructure Preventive Maintenance	-	-	-	-	-	-	-
Fuels Infrastructure Repair	96,093	91,289	93,571	95,910	98,308	100,766	103,285
Precision Measurement Equipment Lab	-	-	-	-	-	-	-
Peterson Total Expenses	***615,082***		***609,296***	***622,525***	***636,045***	***649,863***	***663,984***

Peterson Supplemental Expenses	***t=0***		***t=1***	***t=2***	***t=3***	***t=4***	***t=5***
Transient Alert	406,000	397,880	405,838	413,954	422,233	430,678	439,292
Supply Support	-	-	-	-	-	-	-
Peterson Supplemental Expenses	***406,000***		***405,838***	***413,954***	***422,233***	***430,678***	***439,292***

Academy Activity	***t=0***		***t=1***	***t=2***	***t=3***	***t=4***	***t=5***
Lab Testing	-	-	-	-	-	-	-
Contract Oversight	48,840	46,398	47,558	48,747	49,966	51,215	52,495
Base Fuels Management	428,316	419,750	428,145	436,708	445,442	454,351	463,438
Ground Fuels Management	62,857	61,600	62,832	64,089	65,370	66,678	68,011
Ground Fuel Vehicles	8,000	7,840	7,997	8,157	8,320	8,486	8,656
Ground Fuel Vehicle Maintenance	2,520	2,470	2,519	2,569	2,621	2,673	2,727
Fuels Infrastructure Preventive Maintenance	-	-	-	-	-	-	-
Fuels Infrastructure Repair	-	-	-	-	-	-	-
Academy Total Expenses	***550,533***		***549,050***	***560,269***	***571,718***	***583,403***	***595,327***

Table E-4. Cash Flows for Regionalization Scenario: Peterson AFB and Air Force Academy (Continued)

Peterson Activity	***t=6***	***t=7***	***t=8***	***t=9***	***t=10***	***t=11***	***t=12***
Base Fuels Management	357,579	364,731	372,025	379,466	387,055	394,796	402,692
Fuel Lab Testing	-	-	-	-	-	-	-
Contract Oversight	114,995	117,870	120,817	123,837	126,933	130,107	133,359
Fuel Equip/Vehicles Acquisition	84,704	86,398	88,126	89,889	91,687	93,520	95,391
Fuel Equip Maintenance	15,270	15,651	16,043	16,444	16,855	17,276	17,708
Fuels Infrastructure Preventive Maintenance	-	-	-	-	-	-	-
Fuels Infrastructure Repair	105,867	108,514	111,226	114,007	116,857	119,779	122,773
Precision Measurement Equipment Lab	-	-	-	-	-	-	-
Peterson Total Expenses	***678,415***	***693,164***	***708,238***	***723,643***	***739,387***	***755,478***	***771,923***

Peterson Supplemental Expenses	***t=6***	***t=7***	***t=8***	***t=9***	***t=10***	***t=11***	***t=12***
Transient Alert	448,078	457,039	466,180	475,503	485,013	494,714	504,608
Supply Support	-	-	-	-	-	-	-
Peterson Supplemental Expenses	***448,078***	***457,039***	***466,180***	***475,503***	***485,013***	***494,714***	***504,608***

Academy Activity	***t=6***	***t=7***	***t=8***	***t=9***	***t=10***	***t=11***	***t=12***
Lab Testing	-	-	-	-	-	-	-
Contract Oversight	53,807	55,153	56,531	57,945	59,393	60,878	62,400
Base Fuels Management	472,706	482,160	491,804	501,640	511,673	521,906	532,344
Ground Fuels Management	69,372	70,759	72,174	73,618	75,090	76,592	78,124
Ground Fuel Vehicles	8,829	9,006	9,186	9,370	9,557	9,748	9,943
Ground Fuel Vehicle Maintenance	2,781	2,837	2,894	2,951	3,010	3,071	3,132
Fuels Infrastructure Preventive Maintenance	-	-	-	-	-	-	-
Fuels Infrastructure Repair	-	-	-	-	-	-	-
Academy Total Expenses	***607,496***	***619,915***	***632,589***	***645,523***	***658,723***	***672,195***	***685,943***

Table E-4. Cash Flows for Regionalization Scenario: Peterson AFB and Air Force Academy (Continued)

Peterson Activity	***t=13***	***t=14***	***t=15***	***t=16***	***t=17***	***t=18***	***t=19***	***t=20***
Base Fuels Management	410,746	418,961	427,340	435,887	444,605	453,497	462,567	471,818
Fuel Lab Testing	-	-	-	-	-	-	-	-
Contract Oversight	136,693	140,111	143,613	147,204	150,884	154,656	158,522	162,485
Fuel Equip/Vehicles Acquisition	97,299	99,245	101,229	103,254	105,319	107,426	109,574	111,766
Fuel Equip Maintenance	18,151	18,605	19,070	19,546	20,035	20,536	21,049	21,576
Fuels Infrastructure Preventive Maintenance	-	-	-	-	-	-	-	-
Fuels Infrastructure Repair	125,842	128,989	132,213	135,519	138,907	142,379	145,939	149,587
Precision Measurement Equipment Lab	-	-	-	-	-	-	-	-
Peterson Total Expenses	***788,731***	***805,909***	***823,466***	***841,410***	***859,749***	***878,493***	***897,651***	***917,232***

Peterson Supplemental Expenses	***t=13***	***t=14***	***t=15***	***t=16***	***t=17***	***t=18***	***t=19***	***t=20***
Transient Alert	514,700	524,994	535,494	546,204	557,128	568,271	579,636	591,229
Supply Support	-	-	-	-	-	-	-	-
Peterson Supplemental Expenses	***514,700***	***524,994***	***535,494***	***546,204***	***557,128***	***568,271***	***579,636***	***591,229***

Academy Activity	***t=13***	***t=14***	***t=15***	***t=16***	***t=17***	***t=18***	***t=19***	***t=20***
Lab Testing	-	-	-	-	-	-	-	-
Contract Oversight	63,960	65,559	67,198	68,878	70,600	72,365	74,174	76,029
Base Fuels Management	542,991	553,851	564,928	576,226	587,751	599,506	611,496	623,726
Ground Fuels Management	79,686	81,280	82,905	84,564	86,255	87,980	89,740	91,534
Ground Fuel Vehicles	10,142	10,345	10,552	10,763	10,978	11,197	11,421	11,650
Ground Fuel Vehicle Maintenance	3,195	3,259	3,324	3,390	3,458	3,527	3,598	3,670
Fuels Infrastructure Preventive Maintenance	-	-	-	-	-	-	-	-
Fuels Infrastructure Repair	-	-	-	-	-	-	-	-
Academy Total Expenses	***699,974***	***714,293***	***728,907***	***743,821***	***759,042***	***774,576***	***790,429***	***806,608***

Appendix F
Hickam AFB: Financial Analysis of Public-Private Venture

We projected that, by following a privatization strategy at Hickam AFB, the Air Force would save $11.8 million over the 25-year lease period. This savings is the difference between the cost to the Air Force to build, operate, and maintain the MILCON requirement and the cost to a private operator to do the same. From the private partner's perspective, providing the Air Force MILCON requirement has a net present value of $2.4 million. This appendix contains tables showing the details of our financial analysis.

Tables F-1 and F-2 show the annual costs to the private partner of building and operating storage tanks on HIA property and on Hickam property, respectively. Building on Hickam yields a benefit to the operator of $3.7 million—the expected value of the Hickam land.

Table F-3 shows the annual cash flow to the private partner. The construction tariff is the product of the total annual throughput in barrels and annual price per barrel to build, operate, and maintain the MILCON requirement. The price per barrel also includes a 10 percent fee on the sum of the per barrel construction and O&M charges. The construction expense is based on the $39 million MILCON requirement, reduced 19 percent to reflect efficiencies in private construction and the use of civilian specifications in meeting the requirement. This amount is amortized over 7 years at a 6.5 percent cost of capital—the expected cost of a loan for an A-rated company. An O&M expense of 2 percent of the construction cost is added to the expenses. Finally, the value of the Hickam land is subtracted from the expenses (providing the bulk of the savings to the government and the incentive to the partner to build on Hickam).

Table F-4 compares the cost to the government of providing the original MILCON requirement against the cost of the public-private venture. The cost of the original MILCON requirement is $39 million, and the net present value of the O&M costs over 25 years is $7.4 million. Thus, if it does not participate in the public-private venture, the government's total cost over 25 years is $46.4 million. In contrast, as the table shows, if the government participates in the public-private venture, its total cost is $34.6 million dollars over 25 years, for a potential savings of $11.8 million.

Table F-1. Annual Costs to Operator of Building New Tanks on Airport Property

Item	Year	T=1	T=2	T=3	T=4	T=5	T=6	T=7	T=8	T=9	T=10
Costs											
	Construction	1,458,651	1,458,651	1,458,651	1,458,651	1,458,651	1,458,651	1,458,651	-	-	-
	O&M	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000
	Subtotal	1,618,651	1,618,651	1,618,651	1,618,651	1,618,651	1,618,651	1,618,651	160,000	160,000	160,000
	Leased Value of Real Estate	500,000	510,000	520,200	530,604	541,216	552,040	563,081	574,343	585,830	597,546
Total Costs		2,118,651	2,128,651	2,138,851	2,149,255	2,159,867	2,170,691	2,181,732	734,343	745,830	757,546

Item	Year	T=11	T=12	T=13	T=14	T=15	T=16	T=17	T=18	T=19	T=20	T=21	T=22	T=23	T=24
Costs															
	Construction	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	O&M	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000
	Subtotal	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000
	Leased Value of Real Estate	609,497	621,687	634,121	646,803	659,739	672,934	686,393	700,121	714,123	728,406	742,974	757,833	772,990	788,450
Total Costs		769,497	781,687	794,121	806,803	819,739	832,934	846,393	860,121	874,123	888,406	902,974	917,833	932,990	948,450

PV @15%	10,757,334

Table F-2. Annual Costs to Operator of Building New Tanks on Hickam Property

Item	Year	T=1	T=2	T=3	T=4	T=5	T=6	T=7	T=8	T=9	T=10
Costs											
	Construction	1,458,651	1,458,651	1,458,651	1,458,651	1,458,651	1,458,651	1,458,651	-	-	-
	O&M	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000
	Subtotal	1,618,651	1,618,651	1,618,651	1,618,651	1,618,651	1,618,651	1,618,651	160,000	160,000	160,000
	Leased Value of Real Estate	-	-	-	-	-	-	-	-	-	-
Total Costs		1,618,651	1,618,651	1,618,651	1,618,651	1,618,651	1,618,651	1,618,651	160,000	160,000	160,000

Item	Year	T=11	T=12	T=13	T=14	T=15	T=16	T=17	T=18	T=19	T=20	T=21	T=22	T=23	T=24
Costs															
	Construction	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	O&M	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000
	Subtotal	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000
	Leased Value of Real Estate	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Costs		160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000

PV @15%	**7,102,864**

Benefit to Operator	**3,654,470**

Table F-3. Feasibility of Public-Private Venture at Hickam AFB: Private Partner's Perspective

Item	Year	T=1	T=2	T=3	T=4	T=5	T=6	T=7	T=8	T=9	T=10
Revenue											
	Contruction tariff*	$ 6,480,813	$ 6,469,813	$ 6,458,593	$ 6,447,148	$ 6,435,475	$ 6,423,568	$ 6,411,423	$ 63,203	$ 50,567	$ 37,679
Total Revenue		$ 6,480,813	$ 6,469,813	$ 6,458,593	$ 6,447,148	$ 6,435,475	$ 6,423,568	$ 6,411,423	$ 63,203	$ 50,567	$ 37,679
Expenses											
	Construction	$ 5,759,848	$ 5,759,848	$ 5,759,848	$ 5,759,848	$ 5,759,848	$ 5,759,848	$ 5,759,848	$ (0)	$ (0)	$ (0)
	O&M	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800
	Subtotal	$ 6,391,648	$ 6,391,648	$ 6,391,648	$ 6,391,648	$ 6,391,648	$ 6,391,648	$ 6,391,648	$ 631,800	$ 631,800	$ 631,800
	Less: Value of Leased Lanc	$ 500,000	$ 510,000	$ 520,200	$ 530,604	$ 541,216	$ 552,040	$ 563,081	$ 574,343	$ 585,830	$ 597,546
Total Expenses		$ 5,891,648	$ 5,881,648	$ 5,871,448	$ 5,861,044	$ 5,850,432	$ 5,839,608	$ 5,828,567	$ 57,457	$ 45,970	$ 34,253
Net Flows		$ 589,165	$ 588,165	$ 587,145	$ 586,104	$ 585,043	$ 583,961	$ 582,857	$ 5,746	$ 4,597	$ 3,425

* revenue is cost/barrel payment to private partner to recoup infrastructure development and fee. It is less the value of leased land to private partner.

NPV @15%	$ 2,439,296

	Cost per barrel	$ 3.53	$ 3.52	$ 3.51	$ 3.51	$ 3.50	$ 3.50	$ 3.49	$ 0.03	$ 0.03	$ 0.02
	Fee	$ 0.35	$ 0.35	$ 0.35	$ 0.35	$ 0.35	$ 0.35	$ 0.35	$ 0.00	$ 0.00	$ 0.00
	Total Cost	$ 3.88	$ 3.87	$ 3.87	$ 3.86	$ 3.85	$ 3.84	$ 3.84	$ 0.04	$ 0.03	$ 0.02
	Cost per barrel/month	$ 0.32	$ 0.32	$ 0.32	$ 0.32	$ 0.32	$ 0.32	$ 0.32	$ 0.00	$ 0.00	$ 0.00

Table F-3. Feasibility of Public-Private Venture at Hickam AFB: Private Partner's Perspective (Continued)

Item	Year	T=11	T=12	T=13	T=14	T=15	T=16	T=17	T=18	T=19	T=20	T=21	T=22	T=23
Revenue														
	Contruction tariff*	$ 24,533	$ 11,124	$ (2,553)	$ (16,504)	$ (30,733)	$ (45,248)	$ (60,052)	$ (75,153)	$ (90,555)	$ (106,266)	$ (122,291)	$ (138,636)	$ (155,309)
Total Revenue		$ 24,533	$ 11,124	$ (2,553)	$ (16,504)	$ (30,733)	$ (45,248)	$ (60,052)	$ (75,153)	$ (90,555)	$ (106,266)	$ (122,291)	$ (138,636)	$ (155,309)
Expenses														
	Construction													
	O&M	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800
	Subtotal	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800	$ 631,800
	Less: Value of Leased Lanc	$ 609,497	$ 621,687	$ 634,121	$ 646,803	$ 659,739	$ 672,934	$ 686,393	$ 700,121	$ 714,123	$ 728,406	$ 742,974	$ 757,833	$ 772,990
Total Expenses		$ 22,303	$ 10,113	$ (2,321)	$ (15,003)	$ (27,939)	$ (41,134)	$ (54,593)	$ (68,321)	$ (82,323)	$ (96,606)	$ (111,174)	$ (126,033)	$ (141,190)
Net Flows		$ 2,230	$ 1,011	$ (232)	$ (1,500)	$ (2,794)	$ (4,113)	$ (5,459)	$ (6,832)	$ (8,232)	$ (9,661)	$ (11,117)	$ (12,603)	$ (14,119)

* revenue is cost/barrel payment to private partner to recoup infrastructure development and fee. It is less the value of leased land to private partner.

NPV @15%	$ 2,439,296													
	Cost per barrel	$ 0.01	$ 0.01	$ (0.00)	$ (0.01)	$ (0.02)	$ (0.02)	$ (0.03)	$ (0.04)	$ (0.05)	$ (0.06)	$ (0.07)	$ (0.08)	$ (0.08)
	Fee	$ 0.00	$ 0.00	$ (0.00)	$ (0.00)	$ (0.00)	$ (0.00)	$ (0.00)	$ (0.00)	$ (0.00)	$ (0.01)	$ (0.01)	$ (0.01)	$ (0.01)
	Total Cost	$ 0.01	$ 0.01	$ (0.00)	$ (0.01)	$ (0.02)	$ (0.03)	$ (0.04)	$ (0.04)	$ (0.05)	$ (0.06)	$ (0.07)	$ (0.08)	$ (0.09)
	Cost per barrel/month	$ 0.00	$ 0.00	$ (0.00)	$ (0.00)	$ (0.00)	$ (0.00)	$ (0.00)	$ (0.00)	$ (0.00)	$ (0.01)	$ (0.01)	$ (0.01)	$ (0.01)

Table F-4. Cost to Government of Public-Private Venture vs. Original MILCON Cost

TABLE 4
Cost to Government of Public-Private Venture

	T=1	T=2	T=3	T=4	T=5	T=6	T=7	T=8	T=9	T=10
Construction Tariff	$ 6,480,813	$ 6,469,813	$ 6,458,593	$ 6,447,148	$ 6,435,475	$ 6,423,568	$ 6,411,423	$ 63,203	$ 50,567	$ 37,679
=										
True Cost to Government	$ 6,480,813	$ 6,469,813	$ 6,458,593	$ 6,447,148	$ 6,435,475	$ 6,423,568	$ 6,411,423	$ 63,203	$ 50,567	$ 37,679

TABLE 4
Cost to Government of Public-Private Venture

	T=11	T=12	T=13	T=14	T=15	T=16	T=17	T=18	T=19	T=20	T=21
Construction Tariff	$ 24,533	$ 11,124	$ (2,553)	$ (16,504)	$ (30,733)	$ (45,248)	$ (60,052)	$ (75,153)	$ (90,555)	$ (106,266)	$ (122,291)
=											
True Cost to Government	$ 24,533	$ 11,124	$ (2,553)	$ (16,504)	$ (30,733)	$ (45,248)	$ (60,052)	$ (75,153)	$ (90,555)	$ (106,266)	$ (122,291)
NPV @ 7.0% $ 34,569,726											

Cost to Government of Original MILCON

NPV of O&M	$ 7,362,734
Original MILCON	$ 39,000,000
Total	$ 46,362,734

Appendix G
Fort Leavenworth: Financial Analysis of Bundling

Bundling is the primary strategy that we evaluated to determine the prospects for privatization of the fuel infrastructure at Fort Leavenworth. We formulated two distinct bundling scenarios. One scenario envisions that the Army would establish a partnership with Leavenworth County, which is seeking to establish a full-service, public-use airport. In the other scenario, the Army would establish a partnership with a private firm seeking to operate a profitable venture utilizing Sherman Airfield's facilities. This appendix provides details about our evaluation of these two bundling scenarios at Fort Leavenworth. The appendix begins with a conceptual overview of the two analyses. It then describes our assumptions and explains the values that we assigned to the major parameters.

OVERVIEW OF THE ANALYSES

The fundamental objective of the analyses of both bundling scenarios was to ascertain whether privatization of the airfield at Fort Leavenworth is economically feasible. In general, for both scenarios, we needed to determine whether a potential joint venture partner can obtain or generate enough value from operating the airfield to cover the cost of operations, maintenance, and some construction of the fuels infrastructure during a 25-year lease period. However, the underlying concepts of the analyses of the two scenarios differed somewhat. In the scenario in which Leavenworth County is the partner, the underlying concept was to compare the cost to the county of building a new airport with that of upgrading and operating Sherman Airfield and the Army's fuels infrastructure during the length of the lease. In contrast, for the scenario in which a private firm is the Army's partner, the underlying concept was to compare the projected revenues from private-sector use of the airfield with the projected costs of operating it and the Army fuels infrastructure.

Private Firm as Partner

For the bundling scenario in which a private firm is the Army's partner, we performed a financial analysis using the following procedure:

- We projected pro forma revenues over 25 years utilizing
  - initial fee and price forecasts for airport services,

- ➤ data provided by Fort Leavenworth on prior-year military aircraft operations, and

- ➤ forecasts for civilian aircraft operations and aircraft-related demands from a 1993 Leavenworth County airport study.[1]

We adjusted the civilian aircraft operations forecasts for 2001 to reflect the expected 10 percent increase in demand associated with the opening of the NASCAR track in 2001.[2]

- ◆ We forecasted pro forma expenses over 25 years by

  - ➤ estimating expenditures for operating the airfield and fuels infrastructure, including costs of utilities, management/administration, airfield O&M, control tower operations, fuels operations, and fuels infrastructure O&M;

  - ➤ calculating the amortization expenses on a 7-year loan to finance the construction of the TMP fuel station and the airport upgrades required to make the expected level of general aviation operations possible; and

  - ➤ factoring in capital expenditures on additional tie-down installations during the years in which the demand forecasts require.

- ◆ Finally, we calculated the net present value of the pro forma operating cash flows, derived from the pro forma revenues and expenses.

Leavenworth County as Partner

For the bundling scenario in which Leavenworth County is the Army's partner, we made two fundamental assumptions. The first is that the FAA would fund the operations costs of a control tower at a new airport, even though such funds would be denied for a county-operated Sherman Airfield. The second assumption is that Leavenworth County desires and intends to build a new full-service, public-use airport that would be eligible for construction funding from the FAA.[3] This assumption is critical for the underlying concept that we used. Without it, from an

[1] *Leavenworth City/County Airport Site Selection Study and Master Plan 1991-2010,* Bucher, Willis & Ratliff, May 1993.

[2] We based our predictions of the 10 percent increase on the following analysis. According to NASCAR, average attendance at its races in 1997 was 190,625. Conservatively, we estimated that, if one-quarter of a percent of these attendees flew in on private planes and two races were held per year at the new Kansas City track, then there would be a one-time boost of more than 10 percent in the number of operations at the new regional airport for aircraft based in other cities over that number predicted in the 1993 study.

[3] Under the Airport and Airways Improvement Program, the FAA can provide grants to fund up to 90 percent of the construction costs at qualifying public airports.

analytical perspective, comparing an acquisition of Sherman Airfield with the county's cost of building a new airport would not be valid.

We viewed our evaluation of the county scenario as a cost-benefit analysis of the acquisition of Sherman Airfield from the county's perspective and, therefore, applied the methodology of a standard cost-benefit analysis. To apply this methodology, we utilized a three-step process:

- First, we equated the county's benefit to the airport construction costs that the county avoids by acquiring Sherman Airfield.
- Second, we developed pro forma projections for the incremental costs that the county incurs by acquiring and operating Sherman instead of building a new airport.
- Third, we computed the net present value of the county's incremental costs incurred by acquiring Sherman from the benefit of the cost avoidance gained through this acquisition in order to calculate the net benefit of the joint venture to the county.

We used a conservative approach to calculate the cost avoidance/benefit for this analysis. Specifically, we based our estimate on the county's share of the development costs projected, in the 1993 study, for the site with the lowest development costs—Site 4. To make Site 4 more comparable to Sherman Airfield, we adjusted the development costs to reflect the facilities proposed for Site 4 that are currently not available at Sherman. We made this adjustment by subtracting the county's share of those facilities' costs and inflating the results to account for the 5 years of inflation that had occurred since the completion of the study.

To project the incremental costs utilized in the analysis, we subtracted the operating expenses that would not be funded by the FAA at a new airport from all initial operating expenses and added the result to the amortized expenses for the loan used to finance the construction of a TMP fuel station at the airfield.[4] To create pro forma expenses over a 25-year period, we inflated the net operating expenses at a rate of 2 percent per year over the period, adding them to the constant TMP amortization expenses.

[4] The amortized expenses on the TMP construction loan is an incremental cost to the county relating specifically to the acquisition of Sherman Airfield, because a TMP fuel station for the Army would not be required at a newly constructed airport.

ASSUMPTIONS

We used two types of assumptions to analyze bundling at Fort Leavenworth:

- Underlying assumptions that are critical to the analytical procedures utilized and that further define the analyses scenarios
- Financing and construction-related assumptions.

The underlying assumptions shared by the two scenarios are as follows:

- The operation of Sherman Airfield is transferred from the Army to the partner under a 25-year lease.
- The Army's partner assumes responsibility for all O&M at the airfield, including airport management and tower operations.
- In lieu of making a cash lease payment, the partner operates and maintains, without receiving compensation from the Army, all military fuels infrastructure, including the TMP fuel station.
- The partner constructs a new TMP fuel station near the airfield fuel facilities to facilitate efficient operations.
- The U.S. Department of Transportation or the State of Kansas funds the approximately $1 million in required road extensions for a public-use airfield.
- The partner stores fuel more efficiently than the Army, freeing a 15,000-gallon fuel tank that the partner can use for nonmilitary fuel storage.
- The military procures its own fuel and does not purchase it from its partner.
- The O&M cost for fuels facilities is 5 percent of initial construction costs.
- Private entities other than the partner are willing to construct 25,000 square feet of needed hangar space on land subleased from the partner.
- All operating expenses increase at the rate of inflation.

Additional underlying assumptions that apply only to the private-firm scenario are as follows:

- The partner sells fuel to all nonmilitary users of the airfield.

- Military aircraft operations remain constant during the 25-year period.[5]
- Initially, the partner is able to lease 50 percent of the newly constructed terminal building. By the sixth year, this occupancy rate increases to and stabilizes at 95 percent.
- Of the aircraft based at the airfield, 80 percent utilize T-hangars.
- Of transient aircraft (aircraft based at other airfields), 60 percent utilize tie-downs.
- Landing fees are charged only for military and business aircraft.
- For the calculation of landing fees, military and business aircraft using the airfield weigh an average of 25,000 pounds.

The financing and construction-related assumptions, all of which apply to both scenarios, are as follows:

- The useful life of constructed facilities is 25 years.
- The construction finance rate is 6 percent for the county and 7 percent for the private firm.[6]
- The length of the construction loan is 7 years.
- The inflation rate is 2 percent, which is equivalent to the average rate of inflation during the last several years.
- The rate of return required is 10 percent for the county and 15 percent for the private firm.[7]

[5] This assumption is plausible because no foreseeable reasons exist for military use of the airfield to change significantly.

[6] We expect that Leavenworth County could borrow by issuing nontaxable bonds, thus obtaining a nontaxable interest rate. In contrast, a private firm would have access only to commercial sources of financing and would pay a higher taxable interest rate.

[7] We expect the county to have a longer time horizon than a private firm.

VALUES ASSIGNED TO PARAMETERS

Parameters that apply to both scenarios are the airport upgrade construction costs, the TMP fuel station construction costs, and the initial operations costs. We based the airport upgrade construction costs on the values provided in the 1993 Leavenworth County airport study. We based the TMP construction costs on data that we obtained from the Army's Form 1391 for a bulk fuel storage and retail fuel station at Fort Carson, CO. Finally, we used the following values as the basis for calculating the initial operations costs:

- Utilities expenses of $18,000 and supplies and miscellaneous expenses of $18,500, obtained from the 1993 Leavenworth County airport study.
- Manager/administration costs of $60,000 for one full-time airport manager.
- Airfield O&M costs of $200,000, assuming those costs would be between 1 and 2 percent annually of total airfield construction costs of $10 million to $15 million.
- Tower operations expenses of $126,000, assuming two-shifts, with a single air controller per shift, requiring 2.1 FTEs at $60,000 each. [8]
- Fuel operations expenses of $100,000, assuming 2 FTEs at $50,000 each.
- Fuel O&M of $27,000, projected by calculating 5 percent of estimated TMP construction costs of $159,000 and fuel storage tank construction costs of approximately $400,000.

The remaining parameters apply only to the private-firm scenario. They relate to aircraft operations, demand for aircraft-associated activities, and initial airfield fees and prices. We obtained data on civilian aircraft operations and demand for tie-down spaces from the 1993 airport study. We obtained data on military operations projections from the airfield manager at Sherman Airfield. Other values we used are as follows:

- Fuel sales per based aircraft of 2,000 gallons per operation, from the 1993 study (page 165).
- Fuel sales per transient aircraft of 8 gallons per operation, from the 1993 study (page 66).
- Fuels sales profit margin of 15 percent, from the 1993 study (page 165).

[8] One-tenth of an FTE was added to cover sick and vacation leave for the controllers, since the tower must be manned at all times during the two shifts.

- Monthly tie-down fees of $60, obtained from the fees advertised on the Web site for Livermore Municipal Airport in California. While these fees were twice those projected in the 1993 study, we believe that they are more representative of competitive rates.

- Nightly tie-down fees of $8, calculated by doubling the nightly tie-down fees of $4 projected in the 1993 study on the basis that a competitive nightly rate would have to be adjusted in the same proportion as the monthly rate.

- Landing fees of $3.75 per operation, calculated using Livermore Municipal Airport's landing fees per 1,000 gross weight per operation of $0.15 and assuming that the military and business aircraft using the airfield weigh an average of 25,000 pounds.

- Annual hangar ground leases of $0.25 per square foot and terminal space leases of $7.20 per square foot, from the 1993 study (page 162).

- T-hangar rental rates of $150 per month, by averaging medium T-hangar fees at Livermore Municipal Airport and the T-hangar fees of $70 per month provided in the 1993 study (page 164).

- Auto parking fees per operation of $3.00 and airfield concession fees per passenger of $0.50, based on benchmark data for regional airports.

FINANCIAL ANALYSIS AND CASH FLOWS

Tables G-1 and G-2 display the basic parameters for the financial analysis and the cash flows that we used to evaluate the private partner scenario. Similarly, Tables G-3 and G-4 display the basic parameters for the financial analysis and the cash flows that we used to evaluate the county scenario.

Table G-1. Basic Parameters for the Private-Partner Scenario

REVENUE DRIVERS:

A. Initial Fees and Prices:

Tie-Down Fee/month	$	60
Tie-Down Fee/night	$	8
Hangar Ground Leases per sq. ft. per yr.	$	0.25
Terminal space per s.f. per yr.	$	7.20
T-Hangars/month	$	150.00
Fuel Price/gallon	$	1.00
Auto Parking Fees/operation	$	3.00
Concession Fees/passenger	$	0.50
Landing Fees/op. -- Military & Business only	$	3.75

B. Supply and Demand Related:

Fuel sales per Based aircraft - gals./op.	2000
Fuel sales per Transient aircraft - gals./op.	8
Fuel sale profit margin	15%
Passengers/operation	1.9

PROJECTED DEMANDS:

Year	1998	2000	2004	2014
For Based aircraft	40	89	102	142
For Tie-Down spaces for based aircraft	18	18	21	29
For Tie-Down spaces for transient aircraft	23	23	32	57
For Operations:				
Civilian local	20000	20600	24100	35000
Civilian Transient	10000	14900	19600	35200
Business Jet	300	400	900	2400
Military Local	1200	1200	1200	1200
Military Transient	600	600	600	600
NASCAR-based		1900**	1900	1900

* *Leavenworth City/County Airport Site Selection Study and Master Plan 1991-2010,* Bucher, Will
** Beginning Year 2001 rather than 2000

REQUIRED CAPITAL IMPROVEMENTS:

I. AIRPORT UPGRADE CONSTRUCTION:	Initial Cost	2000	2004	2014
Terminal Building - 3,000 sq.ft.	$ 210,000			
Terminal Fencing	$ 37,500			
80 Parking spaces	$ 84,000			
Fuel Tank - 5,000 gallons	$ 15,000			
Tie-Down Installation	$ 12,300	$ 600	$ 3,000	$ 9,900
61 T-Hangars	$ 732,000			
Sub-Total Airport	$ 1,090,800			
II. TMP CONSTRUCTION:				
2 Retail Fuel Pumps	$ 14,586			
Retail Fuel Storage - 36,000 gallons	$ 91,080			
Retail Operations Facility - 400 sq. ft.	$ 53,200			
Sub-Total TMP	$ 158,866			
Total Capital Improvements	*$ 1,249,666*			

INITIAL OPERATING EXPENSES:

Utilities	$ 18,000	From BW&R
Manager/Administration	$ 60,000	
Supplies & Miscellaneous	$ 18,500	
Airfield O&M	$ 200,000	
Tower	$ 126,000	
Fuel Operations	$ 100,000	
Fuel O&M	$ 27,023	
Total Initial Operating Expenses	*$ 549,523*	

Table G-2. Cash Flows for the Private-Partner Scenario

Year	0	1	2	3	4	5	6	7	8	9	10	11	12
Revenues:													
Fuel Sales		18,360	35,618	46,880	52,721	56,503	60,084	64,732	70,644	75,881	81,300	86,905	92,701
Tie-Down Fees		17,330	38,778	36,060	43,754	48,580	53,581	54,033	56,187	58,406	60,691	63,043	65,466
T-Hangar Rentals		28,800	76,378	91,389	99,043	106,966	115,167	117,470	119,819	122,216	124,660	127,153	129,696
Terminal Space Rentals		5,400	6,610	7,865	9,169	9,937	10,732	11,554	11,786	12,021	12,262	12,507	12,757
Hangar Ground Leases		3,125	6,375	6,503	6,633	6,765	6,901	7,039	7,179	7,323	7,469	7,619	7,771
Auto Parking Fees		90,900	100,521	112,051	125,435	131,516	137,789	157,775	168,340	177,752	187,474	197,514	207,880
Concession Fees		28,785	31,832	35,483	39,721	41,647	43,633	49,962	53,308	56,288	59,367	62,546	65,829
Landing Fees		7,875	8,224	8,583	9,153	9,742	10,351	11,402	12,061	13,181	14,341	15,542	16,319
Total Revenues		200,575	304,335	344,815	385,627	411,654	438,237	473,968	499,324	523,069	547,564	572,829	598,419
Expenses:													
Operations Expenses		549,523	560,514	571,724	583,159	594,822	606,718	618,852	631,230	643,854	656,731	669,866	683,263
Amortization Expenses - Construction Loan		231,880	231,880	231,880	231,880	231,880	231,880	231,880	-	-	-	-	-
Capital Expenditures (Tie-Down Installation)		-	-	637	-	-	-	3,446	-	-	-	-	-
Total Expenses		781,403	792,393	804,240	815,038	826,701	838,598	854,178	631,230	643,854	656,731	669,866	683,263
Cash Flow		(580,828)	(488,058)	(459,426)	(429,411)	(415,047)	(400,360)	(380,210)	(131,905)	(120,785)	(109,168)	(97,037)	(84,844)

Year	14	15	16	17	18	19	20	21	22	23	24	25
Revenues:												
Fuel Sales	104,891	111,295	117,914	123,551	126,526	129,056	131,637	134,270	136,956	139,695	142,489	145,338
Tie-Down Fees	70,528	73,172	75,893	116,632	121,295	126,098	131,045	136,139	141,384	146,785	152,345	139,001
T-Hangar Rentals	134,936	137,635	140,388	143,195	146,059	148,980	151,960	154,999	158,099	161,261	164,486	167,776
Terminal Space Rentals	13,272	13,538	13,809	14,085	14,366	14,654	14,947	15,246	15,551	15,862	16,179	16,503
Hangar Ground Leases	8,085	8,247	8,412	8,580	8,752	8,927	9,105	9,287	9,473	9,662	9,856	10,053
Auto Parking Fees	229,628	241,029	252,794	308,053	314,214	320,498	326,908	333,447	340,116	346,918	353,856	360,933
Concession Fees	72,716	76,326	80,052	97,550	99,501	101,491	103,521	105,591	107,703	109,857	112,054	114,296
Landing Fees	18,434	19,297	20,188	21,621	11,027	11,247	11,472	11,702	11,936	12,175	12,418	12,666
Total Revenues	652,490	680,539	709,449	833,267	841,740	860,952	880,596	900,681	921,217	942,215	963,684	966,566
Expenses:												
Operations Expenses	710,867	725,084	739,586	754,378	769,465	784,855	800,552	816,563	832,894	849,552	866,543	883,874
Amortization Expenses - Construction Loan	-	-	-	-	-	-	-	-	-	-	-	-
Capital Expenditures (Tie-Down Installation)	-	-	-	13,862	-	-	-	-	-	-	-	-
Total Expenses	710,867	725,084	739,586	768,240	769,465	784,855	800,552	816,563	832,894	849,552	866,543	883,874
Cash Flow	(58,377)	(44,545)	(30,137)	65,027	72,275	76,098	80,044	84,118	88,323	92,663	97,141	82,692

NPV **$(2,073,604)**

Table G-3. Basic Parameters for the County Scenario

REQUIRED CAPITAL IMPROVEMENTS:	
TMP CONSTRUCTION:	
Two retail fuel pumps	$ 14,586
Retail fuel storage - 36,000 gallons	$ 91,080
Retail operations facility - 400 sq. ft.	$ 53,200
Subtotal TMP	$ 158,866
Total capital improvements/expenditures	$ 158,866
COUNTY BENEFIT (NEW AIRPORT COST AVOIDANCE) FROM ACQUIRING SHERMAN ARMY AIRFIELD:	
Total county cost of Site 4	$ 3,450,635
Less adjustments for facilities missing from Sherman:	
Parallel runway	$ 237,093
Fuel facilities	$ 30,000
4,050 sq. ft. of terminal space	$ 222,750
2,700 square yards parking	$ 80,200
High intensity runway lights	$ 104,500
Fencing	$ 14,630
Tie-downs	$ 923
Total adjustments	$ 690,096
Adjusted benefit	$ 2,760,539
Adjusted benefit increased for 5-years' inflation	$ 3,047,858
INITIAL OPERATING EXPENSES:	
Utilities	$ 18,000
Manager/Administration	$ 60,000
Supplies and miscellaneous	$ 18,500
Airfield O&M	$ 200,000
Control tower operations	$ 126,000
Fuel operations	$ 100,000
Fuel O&M	$ 27,023
Total Initial Operating Expenses	$ 549,523
Less operating expenses not funded by FAA @ a new airport:	
Utilities	$ 18,000
Manager/administration	$ 60,000
Supplies and miscellaneous	$ 18,500
Airfield O&M	$ 200,000
Total operating expenses not FAA funded	$ 296,500
Initial incremental operations expenses for county	$ 253,023

Table G-4. Cash Flows for the County Scenario

Year	0	1	2	3	4	5	6	7	8	9	10	11	12
Benefit (adjusted and inflated) to county from acquiring Sherman Airfield:	$ 3,047,858												
Costs:													
Incremental operations expenses		253,023	258,084	263,245	268,510	273,881	279,358	284,945	290,644	296,457	302,386	308,434	314,603
Amortization expenses - construction loan		28,458	28,458	28,458	28,458	28,458	28,458	28,458	-	-	-	-	-
Total costs		281,482	286,542	291,704	296,969	302,339	307,817	313,404	290,644	296,457	302,386	308,434	314,603
NPV—total costs	$ 2,822,425	255,893	236,812	219,161	202,834	187,729	173,754	160,826	135,588	125,727	116,583	108,104	100,242

Year	13	14	15	16	17	18	19	20	21	22	23	24	25
Benefit (adjusted and inflated) to county from acquiring Sherman Airfield:													
Costs:													
Incremental operations expenses	320,895	327,313	333,859	340,536	347,347	354,294	361,380	368,607	375,979	383,499	391,169	398,992	406,972
Amortization expenses - construction loan	-	-	-	-	-	-	-	-	-	-	-	-	-
Total costs	320,895	327,313	333,859	340,536	347,347	354,294	361,380	368,607	375,979	383,499	391,169	398,992	406,972
NPV—total costs	92,952	86,192	79,923	74,111	68,721	63,723	59,088	54,791	50,806	47,111	43,685	40,508	37,562

NPV—total costs	$ 2,822,425
Net benefit	**$ 225,433**

Appendix H
Fort Leavenworth: Financial Analysis of Real Estate Exchange

A real estate exchange is the alternative strategy that we evaluated to determine the prospects for fuels privatization at Fort Leavenworth. In the strategy we formulated, we envisioned that the Army would establish a joint venture partnership with a developer. In that partnership, the Army would lease about 50 acres of underutilized land at Fort Leavenworth to the developer in exchange for the developer's assumption of operations, maintenance, and construction costs at the base's TMP fuel station and storage tanks. This appendix contains details about our assumptions and values used in our analysis of the real estate exchange approach at Fort Leavenworth.

OVERVIEW OF THE ANALYSES

The fundamental objective of the analysis of a real estate exchange was to determine the financial feasibility to a developer of obtaining underutilized land at Fort Leavenworth in consideration for providing fuel-infrastructure-related operations, maintenance, and construction services. In general, we needed to ascertain whether the value of the 50 acres of underutilized land is enough to offset the costs of constructing a new TMP at the airfield and of operating and maintaining it and the other fuels infrastructure during the long-term lease.

To evaluate the feasibility of the real estate exchange, we performed a financial analysis using the following methodology:

- We projected pro forma revenues over 25 years by
  - calculating the market value of the land's sale and viewing it as an implicit transfer of capital to the developer, even though it actually obtains no cash,[1] and
  - calculating the revenues obtained from renting out the excess 15,000-gallon fuel storage tank at $0.30 per barrel per month.

[1] We believe that conceptually, this view is justified because once the Army transfers ownership of the land to the developer, it could sell the land and generate cash equivalent to the market value of the land.

- We forecasted pro forma expenses over 25 years by
  - estimating expenditures for operating the TMP fuel station and the three existing airfield storage tanks (including the costs of management/administration, supplies and miscellaneous, fuel operations, and fuel infrastructure operations and maintenance) and adjusting them at the rate of inflation over the 25-year period and
  - calculating the amortization expenses on a 7-year loan to finance the construction of a TMP fuel station.
- Finally, we calculated the net present value of the pro forma operating cash flows, derived from the pro forma revenues and expenses.

In analyzing this approach, we originally intended to project the market value of a 25-year lease on the underutilized land, which probably would have been equivalent to about 80 percent of the market value of a land sale. However, to evaluate the approach under optimal conditions, we decided to modify the analysis to consider a land sale rather than a 25-year lease, when we determined that a long-term lease was not a feasible option due to the relatively low total value of the underutilized land available at Fort Leavenworth. To further optimize conditions, we decided not to restrict the analysis to a pure exchange for fuels infrastructure operations, but factored in the possibility of renting an excess 15,000-gallon fuel storage tank.

ASSUMPTIONS

Underlying assumptions—assumptions that are critical to the analytical procedures utilized and that further define the analysis scenario—are as follows:

- There are 50 acres of underutilized land available at Fort Leavenworth (based on the garrison command's belief that it might be able to provide about 50 acres of land on its border).
- In lieu of providing cash for the land and without receiving compensation from the Army, a developer operates and maintains all military fuels infrastructure, including the TMP fuel station, for 25 years.
- The developer constructs a new TMP fuel station near the airfield fuel facilities to facilitate efficient operations.
- The developer stores fuel more efficiently than the Army, freeing a 15,000-gallon fuel tank that it can rent for nonmilitary fuel storage.

- The tank can be rented only 80 percent of the time, and the fuel stored in the excess tank turns over no more than once a month when the tank is rented.[2]
- The excess storage tank can be rented for only half a year during the first year of the partnership.
- The military procures its own fuel and does not purchase it from the developer.
- The O&M for fuels facilities is 5 percent of initial construction costs.
- All operating expenses and fuel storage rental rates increase at the rate of inflation.

Our assumptions related to financing and construction are as follows:

- The useful life of the constructed facilities is 25 years.
- The construction finance rate is 7 percent for the developer.
- The length of the construction loan is 7 years.
- The inflation rate is 2 percent, which is equivalent to the average rate of inflation during the last several years.
- The rate of return that the developer seeks is 15 percent.

VALUES ASSIGNED TO PARAMETERS

The parameters of the real estate exchange analysis include

- the value of the underutilized land,
- the rental rate of the excess storage tank,
- the construction costs of the TMP fuel station, and
- the initial operations costs.

We calculated the value of the underutilized land from the price per acre the city manager's office paid for industrial land it purchased recently near Fort Leavenworth's underutilized land. We projected the rental rate for the excess storage tank from data we obtained on storage tank rents in the Norfolk area for our Craney

[2] If fuel turnover is greater than once a month, the practice in the fuel storage industry is to add an excess throughput charge.

Island analysis.[3] Similarly, we based the TMP construction costs on data we obtained from the Army's Form 1391 for a bulk fuel storage and retail fuel station at Fort Carson, CO. Finally, we used the following values to determine the initial operations costs:

- Manager/administration costs of $50,000, assuming one full-time manager with total compensation.
- Fuel operations expenses of $100,000, assuming two FTEs at $50,000 each.
- Fuel O&M of $27,000, projected by calculating 5 percent of estimated TMP construction costs of $159,000 and fuel storage tank construction costs of approximately $400,000.

FINANCIAL ANALYSIS AND CASH FLOWS

Tables H-1 and H-2 display the basic parameters for the financial analysis and the cash flows that we used to evaluate the real estate approach.

[3] We used the lowest of the rental rates in the Norfolk area, which ranged from $0.30 to $0.75 per barrel per month for a turnover rate of no more than once a month.

Table H-1. Basic Parameters for the Real Estate Approach

REAL ESTATE RELATED PARAMETERS	
Amount of underutilized land (acres)	50
Sales value of underutilized land (per acre)	$13,000
REQUIRED CAPITAL IMPROVEMENTS -- TMP CONSTRUCTION:	
Two retail fuel pumps	$ 14,586
Retail fuel storage - 36,000 gallons	$ 91,080
Retail operations facility - 400 sq. ft.	$ 53,200
Total	$ 158,866
INITIAL OPERATING EXPENSES:	
Manager/administration	$ 50,000
Supplies and miscellaneous	$ 5,000
Fuel operations	$ 100,000
Fuel O&M	$ 27,023
Total initial operating expenses	$ 182,023

Table H-2. Cash Flows for the Real Estate Approach

Year	0	1	2	3	4	5	6	7	8	9	10	11
Revenue												
Implicit capital transfer (market value of land)	650000											
Excess storage tank rental		514.2857	1049.143	1070.126	1091.528	1113.359	1135.626	1158.338	1181.505	1205.135	1229.238	1253.823
Expenses:												
Operations expenses		182,023	185,664	189,377	193,165	197,028	200,968	204,988	209,088	213,269	217,535	221,885
Amortization expenses - construction loan		33,775	33,775	33,775	33,775	33,775	33,775	33,775	0	0	0	0
Total expenses		215,798	219,439	223,152	226,940	230,803	234,743	238,763	209,088	213,269	217,535	221,885
Cash flow	$650,000	(215,284)	(218,390)	(222,082)	(225,848)	(229,690)	(233,608)	(237,604)	(207,906)	(212,064)	(216,305)	(220,632)

Year	13	14	15	16	17	18	19	20	21	22	23	24
Revenue												
Implicit capital transfer (market value of land)												
Excess storage tank rental	1304.477	1330.567	1357.178	1384.322	1412.008	1440.248	1469.053	1498.434	1528.403	1558.971	1590.151	1621.954
Expenses:												
Operations expenses	230,850	235,467	240,176	244,979	249,879	254,877	259,974	265,174	270,477	275,887	281,404	287,032
Amortization expenses - construction loan	0	0	0	0	0	0	0	0	0	0	0	0
Total expenses	230,850	235,467	240,176	244,979	249,879	254,877	259,974	265,174	270,477	275,887	281,404	287,032
Cash flow	(229,545)	(234,136)	(238,819)	(243,595)	(248,467)	(253,436)	(258,505)	(263,675)	(268,949)	(274,328)	(279,814)	(285,410)
NPV	(813,845)											

Appendix I
Fort Bliss: Financial Analysis of Divestiture

The strategy that we used to evaluate the prospects for privatization of the fuel infrastructure at Fort Bliss is a divestiture of the fuel-related function and its associated infrastructure. The strategy envisions that the Army would relinquish its practice of storing fuel in bulk at Fort Bliss by

- leasing its bulk terminal to a partner for a long-term period and
- purchasing fuel from that partner at a surcharge to cover required MILCON and operations costs over the same period.

The Army's partner would subsequently undertake the renovations required for the bulk storage tanks and operate and maintain the tanks over the length of the lease. Moreover, by operating the terminal under commercial fuels storage practices and, thereby, more effectively utilizing the existing storage capacity, the partner would also create excess storage capacity for its own fuel storage requirements.

This appendix describes the analysis that we developed to evaluate the divestiture approach at Fort Bliss. It includes a conceptual overview of the analysis, a description of our assumptions, and an explanation of the values that we assigned to the major parameters.

OVERVIEW OF THE ANALYSES

Our fundamental objective for our analysis of the divestiture strategy was to determine whether DoD (through the Army) can save costs at Fort Bliss by relinquishing its function of storing fuel in bulk there; divesting itself of the associated storage terminal to a partner; and purchasing fuel at a sufficient surcharge from that partner to provide an acceptable rate of return for renovating, maintaining, and operating that terminal during a 25-year lease period. In general, the analysis needed to assess whether a private partner can, over 25 years, offset the 15 percent rate of return on expenditures required for renovating, operating, and maintaining the bulk fuel terminal through the following:

- Additional throughput by adopting commercial storage practices and more effectively utilizing existing storage capacity
- To a lesser degree, the 19 percent reduction in construction costs through commercial construction procedures (the cost of performing construction

commercially is about 81 percent of the cost of performing the equivalent construction through MILCON).[1]

From an analytical perspective, we used the following process to make this assessment:

- Calculated the surcharge per gallon that the Army's divestiture partner must add to the fuel price during the lease period to earn an acceptable return on the MILCON and O&M expenditures incurred at the bulk terminal
- Compared that surcharge with the implicit surcharge per gallon that DoD and the Army must absorb to recover the MILCON and O&M costs over the same period, if the Army were to retain operating control of the bulk terminal.

We calculated the surcharge under divestiture and the implicit surcharge without divestiture by utilizing the following methodology:

- Projected pro forma expenses over 25 years by
  - determining expenditures for the labor required to operate the bulk fuel terminal (including the costs of management/administration) and adjusting them at the rate of inflation over the 25-year period;
  - estimating expenditures for O&M at the terminal and adjusting them at the rate of inflation over the 25-year period; and
  - calculating
    - for the scenario where divestiture does not occur, the total MILCON costs required for the terminal or
    - for the scenario where divestiture does occur, the amortization expenses on a 7-year loan to finance the total MILCON costs required for the terminal.
- Computed the present value of the pro forma expenses.
- Projected the total annual surcharge payment by calculating the 25-year annuity that would be equivalent to the present value of the pro forma expenses.
- Finally, determined the surcharge per gallon by dividing the annual surcharge payment by the expected annual throughput.

[1] Logistics Management Institute, *The Impact of Federal Government Contracting Requirements on Design and Construction Costs*, Report NA610RD1, Jordan Cassell, Robert Campbell, and Paul Jung, October 1996.

To calculate labor costs, we assumed that, whether the Army or a private partner operated the terminal, manpower levels remain constant at the current 2.3 FTEs. We then used the DoD's standard cost of $55,000 for a civilian FTE. To estimate O&M expenditures at the terminal, we calculated the construction costs required to replace the existing storage capacity at $48 per barrel and set O&M costs at 2 percent of the replacement cost.

For the divestiture analysis only, we adjusted the Army's MILCON costs downward by 19 percent to reflect the fact that commercial costs of construction are 81 percent of military construction costs.[2] We also calculated potential throughput by projecting that

- more efficient commercial utilization of the terminal would make a rehabilitated storage tank of 800,000-gallon capacity available for non-Army needs, and
- the tank would experience one inventory turn per month, or 9.6 million gallons of fuel throughput per year.

We then added the extra throughput to the projected bulk fuel throughput for the Army.

ASSUMPTIONS

We used two types of assumptions in the analysis of the divestiture strategy:

- Underlying assumptions that are critical to the analytical procedures utilized and that further define the analysis scenario
- Financing and construction-related assumptions.

Underlying assumptions applicable to both the status quo and the situation in which the Army divests its bulk fuel storage function and associated terminal are as follows:

- The annual bulk fuel throughput of the Army remains constant at current levels for the 25-year period.[3]
- O&M costs are 2 percent of total construction costs.

[2] See Note 1.

[3] We feel comfortable making this assumption because the mission and the related fuel requirements for Fort Bliss are not expected to change in the foreseeable future.

Underlying assumptions applicable only to the situation in which the Army divests its bulk fuel storage function and associated terminal are as follows:

- The partner's more efficient utilization of the terminal using commercial fuel storage practices makes reactivated storage tank #11025, with 800,000 gallons capacity, available for non-Army needs
- The fuel inventory in tank #11025 turns over once a month.[4]

Financing and construction assumptions applicable to both the status quo and the situation in which the Army divests its bulk fuel storage function and associated terminal are as follows:

- The useful life of constructed facilities is 25 years.
- The rate of return for DoD (under the status quo) is 6 percent (Office of Management and Budget discount rate), while the rate for the private partner (under divestiture) is 15 percent.
- The construction cost to replace a barrel of storage capacity is $48.[5]
- The inflation rate is 2 percent, which is equivalent to the average rate of inflation during the last several years.

Two financing and construction assumptions are applicable only to the situation where the Army divests its bulk fuel storage function and associated terminal:

- The construction finance rate is 7 percent for the partner.
- The length of the construction loan is 7 years.

The Army does not require construction financing under MILCON funding, so there is no loan period or construction finance rate for the status quo.

VALUES ASSIGNED TO PARAMETERS

The major parameters in the analysis of the divestiture strategy are the value of the unfunded military construction, the bulk fuel throughput of the Army at Fort Bliss, and the bulk storage capacity at Fort Bliss.

[4] This rate is equivalent to the standard number of turns that occur in the commercial fuel storage industry.

[5] To calculate the $48 per barrel cost, we used the $39 per barrel private construction cost that we determined for our analysis of Craney Island (see Appendix A for details) and adjusted it upward by just over 23 percent to reflect the fact that private-sector construction costs are 81 percent of the equivalent MILCON costs.

We calculated the value of the unfunded military construction from the DD Form 1391 submitted by Fort Bliss in FY97 for fuels infrastructure MILCON. Similarly, we determined both the bulk fuel throughput and the bulk storage capacity from data submitted to us by the Logistics Division at Fort Bliss.

FINANCIAL ANALYSIS AND CASH FLOWS

Tables I-1 and I-2 display the basic parameters and cash flows that we used to calculate the implicit surcharge the DoD and the Army must absorb when the Army retains the bulk storage function and terminal (i.e., the status quo without divestiture). Similarly, Tables I-3 and I-4 display the basic parameters and cash flows for the surcharge required to cover a partner's costs when the Army divests its bulk storage function and associated terminal.

Table I-1. Basic Parameters for the Implicit Surcharge

UNFUNDED MILITARY CONSTRUCTION:

Project Number	Building/ Tank No.	Cost
FA023026P	11027	$ 274,091
FA023036P	11025	$ 516,407
FA023046P	11024	$ 221,548
FA023056P	11022	$ 355,392
FA023066P	11029	$ 363,745
FA023076P	11019	$ 571,321
FA023086P	11033	$ 674,073
Total MILCON		$2,976,577

POTENTIAL THROUGHPUT:

Bulk Fuel Receipts of:	Gallons
JP8	1,017,215
MUR	408,916
Total Throughput	1,426,130

O&M COSTS:

Total Gallons	1,125,000
Total Barrels	26,786
Cost to replace @ $48/barrel	$1,285,714
O&M Costs @ 2% of construction	$ 25,714

Table I-2. Cash Flows for the Implicit Surcharge

Year	0	1	2	3	4	5	6	7	8	9	10	11	12
MILCON Construction Costs	$2,976,577												
Labor Costs		$ 128,333	$ 130,900	$ 133,518	$ 136,188	$ 138,912	$ 141,690	$144,524	$147,415	$ 150,363	$ 153,370	$ 156,438	$ 159,566
O&M Costs		$ 25,714	$ 26,229	$ 26,753	$ 27,288	$ 27,834	$ 28,391	$ 28,958	$ 29,538	$ 30,128	$ 30,731	$ 31,346	$ 31,972
Total Costs	$2,976,577	$154,048	$157,129	$160,271	$163,477	$166,746	$170,081	$173,483	$176,952	$180,491	$184,101	$187,783	$191,539
Present Value	$5,355,615	$ 145,328	$ 139,844	$ 134,567	$ 129,489	$ 124,602	$ 119,900	$115,376	$111,022	$ 106,833	$ 102,801	$ 98,922	$ 95,189

Year	14	15	16	17	18	19	20	21	22	23	24	25
MILCON Construction Costs												
Labor Costs	$ 166,013	$ 169,333	$172,720	$176,174	$179,698	$183,292	$186,957	$190,697	$194,511	$198,401	$202,369	$206,416
O&M Costs	$ 33,264	$ 33,929	$ 34,608	$ 35,300	$ 36,006	$ 36,726	$ 37,461	$ 38,210	$ 38,974	$ 39,754	$ 40,549	$ 41,360
Total Costs	$199,277	$203,263	$207,328	$211,474	$215,704	$220,018	$224,418	$228,907	$233,485	$238,154	$242,918	$247,776
Present Value	$ 88,140	$ 84,814	$ 81,614	$ 78,534	$ 75,571	$ 72,719	$ 69,975	$ 67,334	$ 64,793	$ 62,348	$ 59,995	$ 57,731

Implicit/Equivalent Annual Surcharge	$418,952
Total Number of Gallons (Throughput)	1,426,130
Implicit Surcharge or Surcharge Equivalent per Gallon -- Without Divestiture	**$ 0.29**

Table I-3. Basic Parameters for the Divestiture Surcharge

UNFUNDED MILITARY CONSTRUCTION:

Project Number	Building/ Tank No.	Cost
FA023026P	11027	$ 274,091
FA023036P	11025	$ 516,407
FA023046P	11024	$ 221,548
FA023056P	11022	$ 355,392
FA023066P	11029	$ 363,745
FA023076P	11019	$ 571,321
FA023086P	11033	$ 674,073
Total MILCON		$ 2,976,577
Adjusted Milcon		$ 2,411,027

POTENTIAL THROUGHPUT:

From Bulk Fuel Receipts of:	Gallons
JP8	1,017,215
MUR	408,916
Total Bulk Receipts	1,426,130
From Potential Excess Fuel Capacity of:	
800,000 gallons @ 1 turn per month	9,600,000
Total Potential Throughput	11,026,130

O&M COSTS:

Storage Capacity -- Total Gallons	1,125,000
Total Barrels	26,786
Cost to replace @ $48/barrel	$ 1,285,714
O&M Costs @ 2% of construction	$ 25,714

Table I-4. Cash Flows for the Divestiture Surcharge

Year	0	1	2	3	4	5	6	7	8	9	10	11	12
Amortization Costs - MILCON		$447,374	$447,374	$447,374	$447,374	$447,374	$447,374	$447,374					
Labor Costs		$ 128,333	$ 130,900	$ 133,518	$ 136,188	$ 138,912	$ 141,690	$ 144,524	$ 147,415	$ 150,363	$ 153,370	$ 156,438	$ 159,566
O&M Costs		$ 25,714	$ 26,229	$ 26,753	$ 27,288	$ 27,834	$ 28,391	$ 28,958	$ 29,538	$ 30,128	$ 30,731	$ 31,346	$ 31,972
Total Costs		$601,422	$604,502	$607,645	$610,850	$614,120	$617,455	$620,857	$176,952	$180,491	$184,101	$187,783	$191,539
Present Value	$ 2,987,188	$ 522,975	$ 457,091	$ 399,536	$ 349,256	$ 305,326	$ 266,943	$ 233,403	$ 57,846	$ 51,307	$ 45,507	$ 40,363	$ 35,800

Year	14	15	16	17	18	19	20	21	22	23	24	25
Amortization Costs - MILCON												
Labor Costs	$ 166,013	$ 169,333	$ 172,720	$ 176,174	$ 179,698	$ 183,292	$ 186,957	$ 190,697	$ 194,511	$ 198,401	$ 202,369	$ 206,416
O&M Costs	$ 33,264	$ 33,929	$ 34,608	$ 35,300	$ 36,006	$ 36,726	$ 37,461	$ 38,210	$ 38,974	$ 39,754	$ 40,549	$ 41,360
Total Costs	$199,277	$203,263	$207,328	$211,474	$215,704	$220,018	$224,418	$228,907	$233,485	$238,154	$242,918	$247,776
Present Value	$ 28,164	$ 24,980	$ 22,156	$ 19,651	$ 17,430	$ 15,460	$ 13,712	$ 12,162	$ 10,787	$ 9,568	$ 8,486	$ 7,527

Annual Surcharge	$462,116
Total Number of Gallons (Throughput)	11,026,130
Surcharge per Gallon -- Divestiture	**$ 0.04**

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13. ABSTRACT *(Maximum 200 words)*

Since FY93, the responsibility for managing the Department of Defense fuel-related infrastructure (storage tanks, pipelines, dispensing facilities, hydrants) has been divided between the military services and the Defense Logistics Agency. The military services are responsible for the maintenance and repair of the fuel infrastructure on their installations, and DLA is responsible for the infrastructures' renovation or major construction. In 1997, DLA projected a funding shortfall of about $1 billion for 120 renovation and major construction projects slated for FY99 through FY03. This report conveys the results of a high-level analysis of the potential for privatizing DoD fuel infrastructure as part of an effort to reduce that shortfall. The study concluded that privatization can be financially feasible, but only at certain locations—those with favorable market conditions and significant infrastructure improvement needs. The report recommends that DoD pursue privatization opportunities at sites where financially feasible. By doing so, it can realize modest reductions in its overall capital improvement costs. The report also recommends that DoD propose legislation for enhanced leasing authority so that it can take full advantage of any opportunities for privatization that it identifies.

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